Computer Courseware Evaluations

A Series of Reports
Compiled by
The Clearinghouse
Computer Technology Project
Alberta Education
October, 1983

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PREFACE

Alberta Education has set up a three stage process for the evaluation of computer courseware. Materials are first screened by the Clearinghouse. If found appropriate, the courseware is evaluated independently by three teachers who have been trained and tested in evaluation techniques and the use of the instrument developed by Alberta Education. Their three reports are synthesized into one report, and if that report is favorable, the materials advance to the final stage. In the third stage, the courseware is assessed by Alberta Education's Curriculum Branch which makes a decision on its status.

Courseware may be designated as a "Prescribed", "Recommended" or "Supplementary" learning resource.

PRESCRIBED LEARNING RESOURCES are those learning resources approved by the Minister of Education as being most appropriate for meeting the majority of goals and objectives for courses or for substantial components of courses outlined in provincial Programs of Study.

RECOMMENDED LEARNING RESOURCES are those learning resources approved by Alberta Education because they complement Prescribed Learning Resources by making an important contribution to the attainment of one or more of the major goals of courses outlined in provincial Programs of Study.

SUPPLEMENTARY LEARNING RESOURCES are those additional learning resources identified by teachers, school boards, or Alberta Education to support courses outlined in provincial Programs of Study by reinforcing or enriching the learning experience.

Materials which are designated as "Prescribed" or "Recommended" are acquired by the School Book Branch for sale to the schools. "Supplementary" materials are not available through the School Book Branch but information on cost and source is given to the schools.

The Supplementary Learning Resources listed in this publication have not necessarily been subjected to the same rigorous evaluation as the "Prescribed" or "Recommended" materials. They have been identified on the basis of evaluation by teachers and Alberta Education officials as described above, but may not have been evaluated by a curriculum committee. They are included in this document to facilitate local acquisition but no formal departmental approval is implied. The responsibility for evaluation prior to purchase rests with the local jurisdiction.

USE OF THIS BOOK

This report is the second issued by the Clearinghouse. The detailed evaluations of the Supplementary and Recommended titles in the previous report (April, 1983) are included in this report as well. The previous lists (courseware being evaluated and courseware the Clearinghouse is unable to evaluate) have been updated. Formal reports will be issued at least once a year with the next scheduled for publication in August, 1984. That report will also be cumulative and will reflect our current focus on science and business education materials.

Less formal reports will be issued periodically to superintendents and principals as new titles are officially designated. Alternatively, up-to-date information on courseware designated between October 1983 and August 1984 can be obtained by phoning the Clearinghouse at (403) 427-0843.

To facilitate distribution of the information within schools, two copies of the report have been sent to each Alberta school principal. A copy also has been sent to each superintendent. Alberta schools/school districts may duplicate further copies as required. Organizations other than educational organizations in Alberta which wish to make copies must obtain permission from The Clearinghouse, Computer Technology Project, Alberta Education, 11160 Jasper Avenue, Edmonton, Alberta, T5K 0L2, (403) 427-0843.

Readers outside Alberta are advised that our evaluative criteria have been based on fairly high expectations and on the Alberta curriculum. As curricula and expectations will vary, materials rejected for Alberta schools should not automatically be disregarded by other provincial or state educational institutions.

This report or portions of this report may not be used for the sale or promotion of any of the materials listed within.

SUBJECT AREA REPORTS AVAILABLE: OCTOBER 1983

Subject	Page Identification
Business Education	BusEd
Library Skills	LibSk
Mathematics	Ma
Science	Sc
Special Education	SpEd
Word Processing	WP

BUSINESS EDUCATION INDEX

RESULTS

PUBLISHER	TITLE	GRADES	STATUS	PAGE
Microsoft	Typing Tutor II	7+?	Supplementary	BusEd 3
South Western Publishing Co.	Automated Accounting for the Microcomputer	10 - 12	Supplementary	BusEd 5

LIST OF TITLES TO BE EVALUATED BusEd 7

LIST OF TITLES WE ARE UNABLE TO RECOMMEND BusEd 9

TYPING TUTOR II

DESCRIPTION

Disk Title: Typing Tutor II
Producer: Microsoft
Address: 10700 Northup Way, Bellevue, Washington, 98004
Users : Not specified
Contents: 1 disk, guide (27p)
Topics: Typing letters, numbers and symbols
Additional Hardware/Software Requirements: Printer (optional)
Other Formats Available (not evaluated): Available in Apple format only

Version: 1981
Cost: See below
Tel. #: (206) 828-8080
Subject: Business Education
Format: Apple II+, IIe

OBJECTIVES

Typing Tutor II is designed to develop and monitor individual typing speed and accuracy. The user is assumed to know typewriter character locations and proper fingering techniques.

CONTENT DESCRIPTION

The content includes complete keyboard coverage: letters, numbers and symbols. Selection of the numbers unit will provide the user with practice in letters as well as numbers. Similarly, selection of the symbols unit includes practice in letters and numbers as well.

Within a unit the student may take a lesson, practice or be tested.

In the lesson, the program identifies the letters/numbers/symbols that the user requires practice on and provides drills on those characters. Drill material is selected based upon the timed speed and accuracy of the user. Letters which the student types with ease are dropped from the practice drills and characters typed with hesitancy are repeated until a proficiency of approximately 30 wpm is gained. After 10 drills, the student may choose to continue the drill, learn new keys, build speed, practice paragraphs (on the letters learned so far) or look at the progress report.

In the practice unit, paragraphs containing all the keyboard characters are presented for practice.

The test unit generates a paragraph designed to test the user's progress. Three test paragraphs are on the disk and these may be edited or others added. A detailed progress analysis is presented at the end of the test.

CONTENT EVALUATION

The drill exercises are not meant to teach keyboarding as no instruction is provided in such integral areas as key location, fingering technique, or shift key operation. Rather they are designed as drill and practice for students who have mastered key locations via classroom instruction. The program is well sequenced in that once a student demonstrates proficiency in typing any one character it is dropped from the practice routine and a new character replaces it. Ample depth is provided through branching which allows students to repeat drills. The option of being able to increase/decrease the required speed of input assures a challenge to even the most proficient typist.

The content of this disk allows for good measurement of typing speed and accuracy. The ability of the teacher to edit the content is an advantage.

INSTRUCTIONAL FORMAT DESCRIPTION

The student interacts with the program by entering letters, numbers and symbols below the drill/test material. The copy material may consist of letter combinations or actual words and sentences. The content of the copy material follows certain parameters but as it is modified to reflect the user's strengths and weaknesses, the copy is in effect randomized for each user.

Correct entries result in the cursor proceeding directly to the next letter/word. Incorrect entries are accepted but there is an accompanying audio beep.

Quantitative feedback is available at the end of drills and tests and consists of information on keys missed, slow keys, accuracy, and words per minute .

(Over)

INSTRUCTIONAL FORMAT EVALUATION

The same method of presentation is used for all drills, new letters, etc. There are no variations for someone who is having difficulty other than to repeat those parts that give trouble. Drill material is individually selected for each user based upon his/her demonstrated speed and accuracy. Letters typed correctly and quickly are replaced by either new letters or letters which have been typed with hesitation. While this instructional technique has merit, the nonsense words that result from the letter combinations definitely inhibit a student's ability to type by context.

Feedback is satisfactory. Summary statements are given after every entry and are continually updated to reflect student progress. Users should be made aware that an error, such as omitting a space, can make all their subsequent entries incorrect until the spacing inaccuracy is corrected.

Control of the various aspects of the program is satisfactory. The user can choose the content and the type of practice, and on drills (s)he can choose to increase or decrease speed from the 30 wpm pre-set rate.

TECHNICAL DESIGN DESCRIPTION

Characters are entered in standard size print, upper case letters only. While no graphics or color are used, sound is used to notify the user when an error has been made.

TECHNICAL DESIGN EVALUATION

Program menus are designed well and the language level is appropriate. There is a need, however, for additional explanatory and instructional input such as reminders regarding next steps, pace of screen visuals, etc. as the user progresses through the program.

Display quality could be improved. Paragraphs on the screen are crowded and some letter confusion exists (e.g. v or u). The Apple's graphic capabilities could have been better used to motivate reluctant students.

MANAGEMENT SYSTEM DESCRIPTION

Management system options are: 1. Review student records 2. Select test paragraphs (from seven available choices) 3. Edit test paragraphs 4. Change the password 5. Delete/add students 6. Produce a print copy of test paragraphs.

The system has a capacity of 49 students.

MANAGEMENT SYSTEM EVALUATION

The management system is easy to access and use. It is accessible only by password, thus security is maintained. It is incumbent upon the teacher to input new test paragraphs periodically, for although the computer randomly selects among its three inherent test paragraphs, these soon become repetitive and tiresome. The printer interface capability allows hard copy generation of test paragraphs. This is useful for individual student practice and allows the teacher to maintain a file of test material.

SUMMARY STATEMENT

This program should be used only after complete classroom instruction has been given in keyboard entry. Experienced students will be motivated by the adjustable speed challenge of the program and the immediate and continuing feedback. Beginning typists would have difficulty learning correct keystrokes and technique (if this program were his/her only instructor) and might find the dearth of directions and the pre-set speed confusing. Also, students who have been conditioned to type by word rather than letter-by-letter may find the random character generation to be frustrating.

STATUS

TYPING TUTOR II has been designated as a SUPPLEMENTARY learning resource.

PURCHASE INFORMATION

This package may be purchased for $31.25 (Oct. 1983) from Bell and Howell, 230 Barmac Drive, Weston, Ontario, M9L 2Z5, (416) 746-2200. Local dealers may also market the disk.

Defective diskettes will be replaced without charge within a one year warranty period.

There is no warranty for disks which become inoperable through normal use.

Teachers will appreciate the fact that the disk is accessed only for recording scores or for beginning new users. As a result, one disk may be used to load several machines.

AUTOMATED ACCOUNTING

DESCRIPTION

Disk Title: Automated Accounting for the Microcomputer
Producer: South Western Publishing Co.
Address: Dept. W, 5101 Madison Road, Cincinnati, Ohio, 45227
Users : High School (Inferred)
Contents: 1 disk, Student Workbook, Teacher's Manual
Topics: General Ledger, Accounts Payable, Accounts Receivable, Payroll

Version: 1982
Cost: See below
Tel. #: (513) 271-8811
Subject: Business Education
Format: Apple II+, IIe

Additional Hardware/Software Requirements: The student workbook is required. A printer is optional.
Other Formats Available (not evaluated): TRS-80 Model I/III/IV, Monroe, IBM

OBJECTIVES

The stated objectives of this program are to teach automated accounting principles in such a way that no prior knowledge of computers or computerized accounting is required and to provide the student with confidence in the use and understanding of a hands-on automated accounting system.

CONTENT DESCRIPTION

This utility disk offers integrated computerized accounting of General Ledger, Accounts Payable, Accounts Receivable, and Payroll. Within each of these four areas, available options include: creating a file, setting run time, maintaining a file, entering transactions, printing reports or returning to main menu.

When used in conjunction with the student workbook, progression is structured. It begins with an overview of computerized accounting (Chap. 1), then presents General Ledger in detail (Chap. 2-4) , progresses to Accounts Payable (Chap. 5-6) and Accounts Receivable (Chap. 7-8) and terminates with Payroll (Chap. 9-10). Each workbook chapter follows a 3-step process: principles are introduced and illustrated, students work through a sample program, and exercises built upon the sample program are presented.

CONTENT EVALUATION

This disk, when used in conjuction with the workbook, offers a close correlation with modules 1-4 of the new Business Education Accounting curriculum. Information is clearly presented in tutorial format and sequencing is appropriate. Principles are introduced individually, interrelationships are effectively presented via detailed system flowcharts (which also guide the user in selecting appropriate courses of action), and projects at the end of each cycle reinforce understanding. Liberal use of well-illustrated examples combined with user disk interaction and subsequent step-by-step guided individual application exercises result in appropriate depth of coverage to meet the stated objectives. All terms are clearly defined at the beginning of each chapter.

Concerns about the content include the fact that worksheets are totally omitted (although adjustments and closing entries are discussed), the payroll section is U.S. formatted and therefore of little value to Canadian users, and the documentation lacks an index or glossary.

INSTRUCTIONAL FORMAT DESCRIPTION

Students access systems within the program by single key selections of options presented in main or sub-menus. Thereafter, alphanumeric entries (guided by on-screen prompts) are required. After data entry, all affected accounts are automatically updated and files are automatically saved when the program is formally terminated. Rate is determined by speed of data entry and system processing speed (which slows with increased amounts of data).

Each data entry screen has a standard display. The fourth line is used to flash system status messages (awaiting reply, processing data, etc.). The bottom two lines are devoted to procedural error messages which are coded by number and referenced in the workbook. If the program is used with a printer interface, documents appear only in hard copy form.

While no formal tests are provided, there is on-going evaluation in that proof entries are provided after each input and all documents are expected to balance. Out-of-balance messages together with the numerical differences are presented for each report. Success is dependent upon complete and accurate entry of all data . Final evaluation rests with the instructor (a teacher's guide complete with answer keys for all exercises is available).

INSTRUCTIONAL FORMAT EVALUATION

This courseware does an excellent job of organizing, calculating and printing accounting information and thus simulating an electronic accounting system. Instructions are explicit, student interaction is frequent and consistent, and feedback is immediate and clear. To fully appreciate this program however, students should have prior familiarization with manual accounting techniques.

Three concerns with instructional format exist: when interfaced with a printer, documents cannot be visually checked for accuracy on the screen prior to printing; the use of proofing documents may obsure the total view of integral accounting forms; and, individual T-accounts cannot be screen viewed or printed.

TECHNICAL DESIGN DESCRIPTION

Neither color nor graphics are used, however sound and inverse lettering are used to draw attention to procedural errors.

TECHNICAL DESIGN EVALUATION

Displays are appropriate, uncluttered, consistent with standard accounting procedure and easily interpreted. Speed of access is dependent upon the amount of information in the files but is generally satisfactory. Generation of print reports at the end of major projects can be time consuming, particularly since no keyboard entry is allowed while printing.

Four problems with technical design are noted:

1. The program does not acknowledge an Epson Parallel Interface Printer.
2. Control S has to be used to enable screen reading. This is not adequately explained in the documentation.
3. There is no provision for storing multiple data sets. Each student must have an individual copy of the program.
4. If the program is booted and left idle for 20 minutes or more, system error messages appear and no further keyboard entry is allowed. Since re-booting is necessary, all data previously entered are lost.

SUMMARY STATEMENT

This program is generally a good utility package which a student should be able to operate independently (provided it is used in conjunction with the workbook). It requires just one disk drive to operate and it provides a comprehensive overview of a computerized accounting process.

STATUS

AUTOMATED ACCOUNTING FOR THE MICROCOMPUTER has been designated as a SUPPLEMENTARY learning resource.

PURCHASE INFORMATION

The package may be purchased from Gage Publishing, 164 Commander Blvd, Agincourt, Ontario, M1S 3C7, (416) 293-8141.

A program disk costs $68.60, the student textbook/manual is $13.15 and the teacher's guide is $11.10. Each student must have his/her own program disk. At the end of the course, that student's data can be erased from the diskette.

A "driver" diskette may be purchased for $108.85 which will allow students to store data on their own diskettes. This allows more than one student to use the disk during the term but the disk can be used with only one computer at a time.

Defective diskettes will be replaced without charge within a 90 day warranty period.

There is no warranty for disks which become inoperable through normal use.

BUSINESS EDUCATION TITLES TO BE EVALUATED

PUBLISHER	TITLE
BLUE CHIP SOFTWARE	MILLIONAIRE
BLUE CHIP SOFTWARE	TYCOON
CONTROL DATA PUBLISHING	KEYBOARDING FOR INFORMATION PROCESSING
GAGE	BASIC INFORMATION KEYBOARDING SKILLS
GAGE	MICROCOMPUTER ORIENTED ACCOUNTING
H&E COMPUTRONICS	BUSINESS PAC 100
HAYDEN BOOK	MICROTYPING 2
MCGRAW HILL RYERSON	ENTERPRISE SANDWICH SHOP
MCGRAW HILL RYERSON	GREGG KEYBOARDING FOR INFORMATION PROCESSING
SRA	FREE ENTERPRISE

BUSINESS EDUCATION TITLES WE ARE UNABLE TO RECOMMEND

PUBLISHER	TITLE	CPYRT.	CODE
BEHAVIORAL ENGINEERING	LETTER MAN	0.0	60
BEHAVIORAL ENGINEERING	TYPING STRATEGY	0.0	60
BLS	COMMUNICATION THEORY	0.0	50
BLS	EFFECTIVE BUSINESS LETTERS	0.0	50
BLS	ORAL COMMUNICATION	0.0	50
BLS	WRITTEN COMMUNICATION	0.0	50
COMPU-TATIONS	TYPING TEACHER	1981.0	41
FULLMER	TYPEMASTER	0.0	60
INDIAN HEAD SOFTWARE	RULE OF 78	1980.0	41
LIGHTNING SOFTWARE	MASTERTYPE	1981.0	43
MANN	BASIC TEACHER	0.0	60
MANN	FLOATING POINT DICTIONARY	0.0	60
MANN	TEACHER PLUS	0.0	60
MCGRAW HILL RYERSON	A MICROCOMPUTER TESTING	0.0	70
MCGRAW HILL RYERSON	DECISION MAKING SIMULATIONS	0.0	70
MCGRAW HILL RYERSON	MICROCOMPUTER APPLICATIONS FOR ACCOUNTING SYSTEMS	0.0	70
MCGRAW HILL RYERSON	PERSONAL KEYBOARDING	1982.0	41
MCGRAW HILL RYERSON	PROFIT & LOSS	1982.0	41
MECC	BUSINESS VOL. 2	1.1	70
MICRO LEARNINGWARE	PACKAGE 1 BUSINESS EDUCATION	0.0	60
MICRO LEARNINGWARE	PACKAGE 2 BUSINESS EDUCATION	0.0	60

NUMERICAL CODES: 40-43: EVALUATED UNFAVOURABLY 50: PRODUCT HAS BEEN DISCONTINUED BY THE PRODUCER

60: UNABLE TO OBTAIN A PREVIEW COPY 70: CONTENT IS OUTSIDE THE ALBERTA CURRICULUM

PUBLISHER	TITLE	CPYRT.	CODE
MICRO LEARNINGWARE	PACKAGE 3 BUSINESS EDUCATION	0.0	60
SCHOOL COURSEWARE JOURNAL	TYPING	1982.0	41
SHERIDAN COLLEGE	MICRO TYPING	1982.0	41
STRATEGIC SIMULATIONS	CARTELS & CUTTHROATS	0.0	60
TECK	TYPING	0.0	60
TELEPHONE SOFTWARE CONNECTION	WALL STREET JOURNEY	0.0	60
WISE OWL WORKSHOP	PERSONAL EXPENSE RECORD	0.0	50

NUMERICAL CODES: 40-43: EVALUATED UNFAVOURABLY 50: PRODUCT HAS BEEN DISCONTINUED BY THE PRODUCER

60: UNABLE TO OBTAIN A PREVIEW COPY 70: CONTENT IS OUTSIDE THE ALBERTA CURRICULUM

LIBRARY SKILLS INDEX

RESULTS

PUBLISHER	TITLE	GRADES	STATUS	PAGE

No titles have reached the final stage as of October 31, 1983

LIST OF TITLES TO BE EVALUATED LibSk 3

LIST OF TITLES WE ARE UNABLE TO RECOMMEND LibSk 5

LIBRARY SKILLS TITLES TO BE EVALUATED

PUBLISHER	TITLE
CALICO	ALMANACS
CALICO	BARTLETT'S FAMILIAR QUOTATIONS
CALICO	CURRENT BIOGRAPHY
CALICO	LIBRARY CATALOG
CALICO	PERIODICAL INDEXES
CALICO	POETRY INDEXES
COMBASE	ELEM. LIBRARY MEDIA SKILLS
LEARNCO	ANSWERING QUESTIONS LIBRARY STYLE
RIGHT ON PROGRAMS	CARD CATALOG
SCHOOL HOME COURSEWARE	LIBRARY SKILLS

LIBRARY SKILLS TITLES WE ARE UNABLE TO RECOMMEND

PUBLISHER	TITLE	CPYRT.	CODE
CALICO	ESSAY & GENERAL LITERATURE	0.0	50
MICRO POWER LIGHT	LIBRARY SKILLS	0.0	40
MICROCOMPUTERS IN EDUCATION	BOOKSHELF	1981.0	41
RIGHT ON PROGRAMS	BIOGRAPHIES	1983.0	41
RIGHT ON PROGRAMS	CATALOG CARDS	1983.0	41
RIGHT ON PROGRAMS	COPYRIGHT NOTICE	1983.0	41
RIGHT ON PROGRAMS	DEWEY DECIMAL SYSTEM	1983.0	41
RIGHT ON PROGRAMS	DICTIONARY SKILLS	1983.0	41
RIGHT ON PROGRAMS	FICTION SKILLS	1983.0	41
RIGHT ON PROGRAMS	INDEX	1983.0	41
RIGHT ON PROGRAMS	LOCATING BOOKS	1983.0	41
RIGHT ON PROGRAMS	REFERENCE TABLES IN AN ALMANAC	1983.0	41
RIGHT ON PROGRAMS	TABLE OF CONTENTS	1983.0	41
RIGHT ON PROGRAMS	TITLE PAGE	1983.0	41

NUMERICAL CODES: 40-43: EVALUATED UNFAVOURABLY

50: PRODUCT HAS BEEN DISCONTINUED BY THE PRODUCER

60: UNABLE TO OBTAIN A PREVIEW COPY

70: CONTENT IS OUTSIDE THE ALBERTA CURRICULUM

MATHEMATICS INDEX

RESULTS

PUBLISHER	TITLE	GRADES	STATUS	PAGE
Addison Wesley	Computer Graphing Experiments Volume 1	10 - 12	Recommended	Ma 3
Addison Wesley	Computer Graphing Experiments Volume 2	10 - 12	Recommended	Ma 3
Addison Wesley	Computer Graphing Experiments Volume 3	10 - 12	Recommended	Ma 3
Developmental Learning Materials	Alien Addition	1 - 6	Supplementary	Ma 5
Developmental Learning Materials	Minus Mission	1 - 6	Supplementary	Ma 5
Developmental Learning Materials	Meteor Multiplication	1 - 6	Supplementary	Ma 5
Developmental Learning Materials	Demolition Division	1 - 6	Supplementary	Ma 5
Developmental Learning Materials	Alligator Mix	1 - 6	Supplementary	Ma 5
Developmental Learning Materials	Dragon Mix	1 - 6	Supplementary	Ma 5
ECR Educational Consultants	Math Drill	3 - 5	Supplementary	Ma 7
Edusoft	Count And Add	K - 3	Supplementary	Ma 9
Edu-Ware Services	Counting Bee	K - 3	Supplementary	Ma 11
Houghton Mifflin Canada Ltd.	Math Activities Courseware 6	6	Recommended	Ma 13
Indian Head Software	Laser Chaser	7 - 9	Supplementary	Ma 15
Learning Company	Gertrude's Puzzles	1 - ?	Supplementary	Ma 17
Learning Company	Gertrude's Secrets	K - 4	Supplementary	Ma 19
McGraw-Hill Ryerson	Math Skill Games	1-6	Supplementary	Ma 21
MECC	Elementary Volume 1	1 - 6	Supplementary	Ma 23
Microcomputer Workshops	Equations	7 - 11	Supplementary	Ma 25
Microcomputer Workshops	Multiplying Fractions	5 - 8	Supplementary	Ma 27
Microcomputer Workshops	Quadratic Equations	9 - 12	Supplementary	Ma 29
Milliken Publishing Company	Math Sequences	1 - 8	Recommended	Ma 31
Random House	Galaxy Math Facts	1 - 9	Supplementary	Ma 33

(Over)

SRA	Mathematics Level A	1 - 2	Recommended	Ma 35
SRA	Mathematics Level B	3- 4	Recommended	Ma 35
SRA	Mathematics Level C	5+	Recommended	Ma 35
Sunburst Communications	Explorer Metros	4 - 9	Supplementary	Ma 37
Swift Publishing Company	Fractions/Decimals	7 - 9	Supplementary	Ma 39
Swift Publishing Company	Whole Numbers	1 - 9	Supplementary	Ma 41

LIST OF TITLES TO BE EVALUATED Ma 43

LIST OF TITLES WE ARE UNABLE TO RECOMMEND Ma 47

COMPUTER GRAPHING EXPERIMENTS Vol. 1
COMPUTER GRAPHING EXPERIMENTS Vol. 2
COMPUTER GRAPHING EXPERIMENTS Vol. 3

DESCRIPTION

Disk Title: COMPUTER GRAPHING EXPERIMENTS Volume 1,2 & 3
Version: 1981
Producer: Addison Wesley (Canada) Ltd.
Cost: $179.52 ($67.32 each)
Address: P.O. Box 580, 36 Prince Andrew Place, Don Mills, Ontario, M3C 2T8
Tel. #: (416) 447-5101
Users : High School
Subject: Mathematics
Contents: Per Volume - 1 diskette, 1 backup, suggested experiments, black line masters
Format: Apple II+, IIe
Topics: Vol. 1: Linear & quadratic functions & inequalities, absolute value, polynomials, exponential & log. functions.
Vol. 2: Sine, cosine, cotangent, period, amplitude, phase shift and polar coordinates.
Vol. 3: Parabolas, ellipses, hyperbolas, general quadratic functions, inequalities.
Additional Hardware/Software Requirements: Color monitor desirable
Other Formats Available (not evaluated): Available in Apple format only

OBJECTIVES

To allow students to quickly see and study graphs of the elementary functions encountered in high school courses from algebra through pre-calculus mathematics.

CONTENT DESCRIPTION

Volumes 1-3 present graphing utility programs which will graph specific functions. The student inputs the parameters in response to questions from the computer. The range of the content is indicated above.

The instructional aspect of these programs is provided through experiments included with each volume. These experiments suggest functions to be plotted and ask the user to make conclusions based on the results. Sixty-seven experiments are available in the three volumes. Answers for most of the suggested activities are provided in the documentation.

CONTENT EVALUATION

Sufficient range and depth are provided in these volumes. The student is able to lead himself/herself through the simple problems to more difficult ones.

The support materials are essential if the student is to work through this material on his/her own. Experiments are suggested and the worksheets provide a beginning. However, these can easily be expanded by the teacher.

Graphs can be overlaid on the same plane thereby easily showing a relationship between equations when a change is made. A color monitor is desirable but is not essential.

Some graphs which are plotted in Volume 1 should have a check made on the domain. The program allows input of positive and negative constants but does not check to determine if the ordered pairs are within the limits of the screen.

INSTRUCTIONAL FORMAT DESCRIPTION

This is a graphing utility package which provides teacher and student with a tool which may be used to see the relationships between graphs. The student interacts with the program by choosing the function desired. Constants and coefficients are then entered. The user is also given the option of overlaying one graph upon another. Within the print materials, the user completes charts which are designed to point out interrelationships. (S)he also answers questions which are designed to point out the pertinent characteristics of each function.

The feedback consists of the graph which is drawn in response to the student's inputs. Incorrect entries result in the questions on domain and range being reposed.

The programs are linear in design once the program has been entered. However, the teacher and/or the student has the choice of which function to study. The user may return to the main menu after each function is graphed. The user controls the sequence, the number of questions and the length of time that the graph remains on the screen.

(Over)

INSTRUCTIONAL FORMAT EVALUATION

This series of programs is not drill and practice or tutorial in nature and as a result it may be considered as "non-instructional". The programs are written in such a way that a teacher may use them in a classroom to demonstrate the graphing of mathematical functions and these programs will contribute effectively to that type of instruction.

The package may be considered partly instructional if the user completes the experiments suggested in the documentation. In this case, the package may again be effective. However, it is the print material which will be providing the instruction. The computer package is used solely as a tool. The programs themselves offer no instruction or help to the student. No evaluation of the student input is provided, the user is not required to enter any conclusions and no instruction is provided on any aspect of the function being investigated in the computer part of the package.

TECHNICAL DESIGN DESCRIPTION

Graphs are displayed using high resolution graphics. No text is used other than to give instructions to the student about entering numbers. Graphs are displayed in color but a color monitor is not essential to the program.

TECHNICAL DESIGN EVALUATION

It is possible to have too many graphs on the same screen but this is controlled by the user. One other weakness is the amount of shading in the graphing of inequalities. Crosshatching may have been a better technique.

The program has a number of minor bugs. For example, when drawing a circle with a radius of an irrational number, a "hole" is left in the figure. Also, responses to illegal entries are at times unsatisfactory (e.g. input of 0 for the value of A in the function " Y = AX^2 " causes the program to flip back to the menu). In addition, the instructions are not always clear as to what actual input is necessary.

Generally, the program is effective in its technical design and is relatively easy to use provided that instruction on the function is given prior to its use.

SUMMARY STATEMENT

The major strength of this package is that it allows a teacher to utilize a computer in a classroom setting as a teaching tool. A sufficient range of situations in each graphing experiment is given to allow students to explore new areas on their own. Ample opportunity is provided for discovery and experimentation.

The weakness of the package is that its effectiveness is dependent upon the print materials and the diligent completion of the suggested tasks. Explanations, instructional assistance and explanatory feedback are not provided.

STATUS

COMPUTER GRAPHING EXPERIMENTS, VOLUMES 1,2, and 3 have been designated as RECOMMENDED learning resources.

PURCHASE INFORMATION

The commercial list price is $67.32 but each volume is available from the School Book Branch for $53.13 (Oct. 1983) (S.B.B. list price of $62.50 - 15%).

Each volume comes with a backup diskette. Additional disks may be purchased for $22.06 (S.B.B. list price of $25.95 - 15%).

Defective diskettes will be replaced through the S.B.B. without charge within a one year warranty period.

Diskettes which become inoperable through normal use will be replaced free of charge in the first year. After one year, disks may be replaced through the S.B.B. for $11.00.

One disk may be used to load several computers so long as only one function is explored. The program has to return to the disk menu in order to access other functions.

ALIEN ADDITION
MINUS MISSION
METEOR MULTIPLICATION
DEMOLITION DIVISION
ALLIGATOR MIX
DRAGON MIX

DESCRIPTION

Series Title: Arcademic Skill Builders in Mathematics
Producer: Developmental Learning Materials
Address: P. O. Box 4000, One DLM Park, Allen, Texas, 75003
Users : Elementary Grades
Contents: Each title has a disk, guide (20p), 53 flashcards, 12 blackline masters
Topics: Addition, subtraction, multiplication and division of whole numbers 0-9
Additional Hardware/Software Requirements: Color monitor preferable, game paddles optional
Other Formats Available (not evaluated): TI 99/4A

Version: 1982
Cost: $39 U.S. per disk
Tel. #: (214) 248-6300
Subject: Mathematics
Format: Apple II+, IIe

OBJECTIVES

To assist students in learning basic arithmetic facts through motivational practice. Following extensive drill, the student will correctly answer basic fact problems at a rate of 40-90 responses per minute with 100% accuracy.

CONTENT DESCRIPTION

Four disks provide students with drill in the indicated operation. Additionally, "Alligator Mix" gives practice in addition and subtraction and "Dragon Mix" has practice in multiplication and division. All content is presented in an arcade game format where problems appear and the user manipulates the keyboard to enter or signify the correct answer.

In each disk the teacher may control the content range (digits 0-3, 0-6 or 0-9), the time limit to answer questions (1-9 seconds) and the length of the drill (1-5 minutes).

Also included are flashcards, worksheets, student record sheets, progress cards and improvement strategies.

CONTENT EVALUATION

Content range, sequence and depth are generally appropriate as the teacher is able to contol these parameters. This allows students of varying abilities to enter and progress through the disk(s). Although any one disk may be inappropriate at a particular grade level, the series as a whole is appropriate to the target audience.

The subtraction range is somewhat limited as it does not extend into double digits.

The supplementary materials included with the disks have limited value.

As the content is presented in game format, there is no instructional component.

The arcade format does have a violent theme. Tanks are destroyed by guns, aliens are shot down by a cannon, meteors are fired at, a city is protected by fire and atomic clouds are present. Only "Alligator Mix" is non-violent.

INSTRUCTIONAL FORMAT DESCRIPTION

There are two types of interaction. In the first four games, students enter an answer and then aim and fire using one of a variety of keyboard methods. In the combined operation diskettes, the user matches an answer with a question using keyboard manipulation.

Feedback is presented both graphically and audibly. A correct answer results in the target being successfully eliminated. If an incorrect answer is entered, there is no visible result in most programs. (In "Demolition Division", the length of the cannon shot depends upon the accuracy of the answer.) If too many incorrect answers are entered, the user loses the game.

Running scores are kept and quantitative feedback is given at the end of the games. Additionally, high scores may also be shown.

(Over)

INSTRUCTIONAL FORMAT EVALUATION

Success in these games is very dependent upon proficiency in manipulating keys in the correct order and this does take a measure of skill and practice. In addition, in some disks there is no easy way of erasing an error and it is faster, and thus desirable in this game format, to do nothing about the error. The game "Alligator Mix" is particularly bad in this respect. If the answer is not entered soon enough, not only does the student receive an error on that question, but the program accepts that answer for the next question, thus adding to the error total and the frustration of the user.

A number of evaluators have observed that more attention has to be paid to manual dexterity than has to be devoted to getting the answer. It is questionable whether an increase in proficiency is an increase in recall of number facts or is instead an improvement in keyboard manipulation. The fact that different methods of input are available is an advantage but this does not diminish the high emphasis that is placed on keyboard manipulation to the detriment of answer recall.

Negative feedback is poor. Through the game format, no extra assistance is given when an incorrect answer is entered. The speed necessary to run the game does not allow extra attention to be given to incorrect answers. There is no way of reviewing incorrect answers and re-presentation of such questions is not guaranteed. As a result, students may practice the facts that they already know but will not learn the facts in which they are weak.

Control of the various parameters of the program is good and adds much to the package.

The teacher must monitor the initial play of each student. As there is no pre-test, it is important that the student be placed at the appropriate speed level. The philosophy stated in the documentation that "high error rates are important in early stages" is not acceptable.

TECHNICAL DESIGN DESCRIPTION

Color, sound and animation are used throughout the disks. Numbers appear in standard text size and in white.

TECHNICAL DESIGN EVALUATION

Apart from a number of minor cases, color, sound and graphics are used in a highly effective and appropriate manner. In spite of extensive graphics, the speed of the program is good. Generally speaking the technical design of the disks is a motivating factor for the students.

Problems include the operation of the alligator's mouth, determining which spaceship the dragon's mouth is pointing at, difficulty in reading scoreboards and distractions caused by sound which cannot be turned off. Instructions on the operation of the games could be included within the program.

SUMMARY STATEMENT

Advantages include the content sequence and depth. Students can receive practice in a particular skill and the focus on speed recall will likely have positive results for many. The programs are suitable for what they are intended to do. The material correlates with the Alberta curriculum only at the basic facts level.

The game format has serious weaknesses in helping students overcome deficiencies. There is no help and, with the entire focus being on speed, the student's attention is directed towards entering answers and not determining why an answer is wrong. Also, the programs are expensive in relation to their scope of coverage.

Some students found the games very motivating. Others soon became frustrated or disinterested.

As our evaluators were split on the value of these programs and as acceptance of the package appears to depend upon the acceptance of the game format with its inherent violence and lack of direct instructional component, teachers are stongly urged to preview before buying.

STATUS

The six disks in the ARCADEMIC SKILL BUILDERS IN MATHEMATICS series have been designated as SUPPLEMENTARY learning resources.

PURCHASE INFORMATION

Each of the six packages may be purchased for $39 U.S. (Oct. 1983) from Developmental Learning Materials at the address given at the beginning of the report. The total package costs $220 U.S.

In Canada the package may be purchased for $53 from PMB Industries, 1220 Ellesmere Road, Unit #17, Scarborough, Ontario, M1P 2X5, (416) 298-2611. The full package costs $299.

Disks which become inoperable for any reason will be replaced by PMB without charge within a six month warranty period. There is no further warranty but PMB may provide replacements for a lower price.

The entire program is loaded during the initial boot and this will allow a single disk to be used in a number of computers. The disk, however, is required to change the problem parameters.

MATH DRILL

DESCRIPTION

Disk Title: Math Drill
Producer: ECR Educational Consultants
Address: c/o Bell & Howell, 230 Barnac Drive, Weston, Ontario, M9L 2X5
Users : Grades 3-5
Contents: Management disk, program disk, guide (48p), single or dual drive versions
Topics: Fundamental operations with whole numbers and decimals; metrics
Additional Hardware/Software Requirements: A printer is optional
Other Formats Available (not evaluated): Available in Apple format only

Version: 3.01
Cost: $350
Tel. #: (416) 746-2200
Subject: Mathematics
Format: Apple II+, IIe

OBJECTIVES

To provide drill on the four basic mathematical operations (addition, subtraction, multiplication and division).

CONTENT DESCRIPTION

The program generates drill questions for grades 3,4 and 5. Each grade is divided into 24 chapters and each chapter consists of a pre-test, five lessons and a post-test. Each lesson may be presented in one of five levels of difficulty as determined by preceding session results. Both tests are presented at the top difficulty level.

The range covers whole numbers, decimals and metrics. Generally, 10 questions per lesson are presented but this may be modified by the teacher. All four operations are integrated within a spiral approach.

CONTENT EVALUATION

The range, sequence and depth of the content are all appropriate to the target audience and to the objectives of the program. The sequence, while following a development of easy to hard, does not allow the teacher to easily give practice in one particular operation nor does it necessarily follow the sequence of the Alberta curriculum. Teacher control is necessary.

With teacher intervention, the content can be rated very highly.

INSTRUCTIONAL FORMAT DESCRIPTION

Students answer questions as in a paper/pencil format. The feedback consists of a large "X" or a check mark. The correct answer is also given if the input is wrong. Sounds and other messages provide hints but otherwise there is no remediation or help available. Quantitative results are given at the end of the lesson.

Pre-tests and post-tests are available for each chapter with the results stored in the student management file. Pre-test results determine the difficulty level for the first lesson. These difficulty levels provide students with varying routes through the continuum.

Unless changed by the teacher, the sequence is controlled by the program. Once installed in a chapter, the user's progress is determined by the program and his/her results. The number of questions is similarly controlled by the program or by the teacher through the management system.

INSTRUCTIONAL FORMAT EVALUATION

Student interaction is good and the feedback, although limited, is done well. The presence of pre/post tests is good, although their potential effectiveness is somewhat limited by a lack of diagnosis and prescription. Sequence, rate and amount are all appropriately controlled.

The program does attempt to adjust the level of difficulty if the user does poorly but it is not designed to provide any feedback beyond an indication of the correct answer. The student must be familiar with the material before starting the chapter. The lack of instruction and remediation limit the program's potential use.

No matter how well or poorly a student performs, the program advances his/her to the next lesson. Close monitoring by the teacher is required.

(Over)

TECHNICAL DESIGN DESCRIPTION

Text and numbers are shown in standard sizes. Sound is used to cue the student to various input errors. Graphics are used in the metric questions.

TECHNICAL DESIGN EVALUATION

There may be minor problems with a lack of sufficient direction on the screen to the user. Also, the small size of the digits may create problems for younger students or for classes without a good monitor. Generally, the technical quality is very good.

MANAGEMENT SYSTEM DESCRIPTION

Through the management system, the teacher is able to control the following parameters: minimum number of questions, number of attempts per question, allocation of extra questions, time limits, and starting location in the course. Reports of various kinds are also available and all the necessary features for entry of data are available.

The management system guides the user through the lessons and determines which level of difficulty will be presented. Success on a previous lesson determines whether the level will be altered.

Records for 40 students and up to 200 sessions can be kept. It is advisable for each teacher to have his/her own data management disk.

MANAGEMENT SYSTEM EVALUATION

Weaknesses include:

1. The system is designed to collect data and not to prescribe or evaluate.
2. A student who fails an entire chapter can still be advanced to the next chapter. A mastery level is not required before advancing.
3. A student is allowed to remain at the bottom level throughout a chapter but the test is presented at the top level of difficulty.
4. There is no provision to advance a student who scores well on the pre-test.

While these disadvantages can be circumvented, it requires close teacher supervision of each student. The management system is strong in providing the teacher with a great deal of flexibility in meeting the needs of the individual student in specific lessons.

The ability to control the number of questions, the number of attempts per question and the amount of time given to each student are major strengths.

SUMMARY STATEMENT

Major advantages include the development of the content, the flexibility and control provided to the teacher and the features of the management system. Disadvantages include the progression from pre-test to lesson and from one chapter to another without regard to results, the lack of mastery level requirements and the lack of remediation. Most of these problems can be overcome somewhat through regular supervision by the teacher. The program will not stand on its own but through utilization of the management system features, it will assist the teacher in providing his/her students with arithmetic practice.

STATUS

MATH DRILL has been designated as a SUPPLEMENTARY learning resource.

PURCHASE INFORMATION

A single disk drive version (#769523) or a dual drive version (#769523D) is available for $350 (Oct. 1983) from Bell and Howell. Contact Bell and Howell for the price of the management diskette alone.

Defective diskettes will be replaced without charge within a 30 day warranty period.

There is no warranty for disks which become inoperable through normal use.

The disk may not be used with more than one computer at a time.

COUNT AND ADD

DESCRIPTION

Disk Title: Count and Add
Producer: EduSoft
Address: P.O. Box 2560, Dept. 50, Berkeley, California, 94702
Users : Pre-kindergarten to grade 3
Contents: 1 disk, guide (3p), backup copy may be made.
Topics: Basic counting and addition skills
Other Formats Available (not evaluated): Available in Apple format only

Version: 1982
Cost: $24.95 U.S.
Tel. #: (415) 548-2304
Subject: Mathematics
Format: Apple II+, IIe

OBJECTIVES

Young children will learn basic counting and addition skills through four related programs.

CONTENT DESCRIPTION

In "Count", the user is required to count colored objects.

"Add1", "Add2" and "Add3" ask the user to add objects (maximum of 16 in each group). The difference between the programs is in the amount of concrete assistance given. "Add1" requires the user to count two groups of objects and the objects are then moved together for the determination of the sum. "Add2" presents objects to be counted and then added but does not move them together. In "Add3" the user adds digits without the assistance of concrete objects. If an error is made, the feedback presents objects to be counted and added.

Five questions are provided in each round for each program. At the end of each round the student may continue or be returned to the menu.

The programs are sequenced internally. Success in any program leads the student to more difficult questions in that same program. In "Count" this means progression of up to 56 objects to be counted. In the adding programs, the ceiling is adjusted up to a maximum of 16 in each group. Lack of success results in regression to an easier level. As no records are kept, this progression and regression is available only during the sitting.

The teacher can adjust maximum ceilings, initial ceilings and number of questions by changing the program listing. Instructions on how to do this are given in the documentation.

CONTENT EVALUATION

The sequencing is excellent. Not only is there increasing difficulty in the size of questions, but also there is a sequence from concrete to abstract. The material in one program is built upon the content and presumed success in previous program(s). The amount of practice is good. The content range is somewhat limited but the price of the disk reflects this limitation.

The content is appropriate to students in division 1. The material presented (recognizing, knowing and learning number facts) provides for effective, worthwhile and constructive practice in this area.

Teacher control of parameters is another good feature.

INSTRUCTIONAL FORMAT DESCRIPTION

Student interaction consists of entry of numerical answers, depression of the space bar to continue, selection of menu items and decisions on continuing.

Positive feedback ("YES" plus an audio signal) is given immediately after each correct intermediate and final answer.

There is a range of negative feedback methods. On any counting question or subquestion, the first error results in the objects being counted for the user. The user is then expected to put in the correct answer. If an error is made again, the correct answer flashes a number of times and then remains on the screen. The next question or subquestion is then presented.

(Over)

Depending upon the level of assistance presented in the question, errors on adding questions result in entry into the the following sequence.The user will progress through this sequence if (s)he continues to have difficulty with the question.

1. Concrete objects are shown.
2. The concrete objects are moved together.
3. The concrete objects are counted.
4. The correct answer is flashed.

Through this procedure, the user receives more chances in the more difficult programs and progressively more concrete forms of assistance.

Quantitative feedback consisting of a percentage score and the level of difficulty attained is provided at the end of each round if the teacher wishes it.

INSTRUCTIONAL FORMAT EVALUATION

Apart from some possible confusion in a user's first question, the interaction is good. In "Count", does the user count the number of objects from 1 to N or does (s)he enter the total number? This will occur only on that first question.

The feedback is very good. The amount of assistance increases with the difficulty of the program and it utilizes the skills the user has already gained. It may have been advantageous to provide the user with more than one attempt at a question before providing remediation. Users in this target audience may frequently make entry errors and they may be frustrated by the unnecessary feedback.

TECHNICAL DESIGN DESCRIPTION

Numbers and objects are presented in large size, high resolution characters. Color and sound are also used. The teacher may eliminate the sound by making a change in the program listing.

TECHNICAL DESIGN EVALUATION

Graphics are large, clear and effective.

There are a few minor weaknesses. In counting large numbers, it would have been preferable to have the numbers grouped in sets of 10. Sound reinforcements may become monotonous and/or distracting, however, they may be eliminated. The program could be more user friendly by asking for and using the student's name. Also an option in the menu to exit from the program should be added.

The preview copy supplied was in DOS 3.2 format. It is hoped that copies sold to schools will be in DOS 3.3 format.

SUMMARY STATEMENT

This disk does a very good job in achieving its objectives. Content sequence and depth are both good. Feedback is excellent. The sequence from easy to difficult and from concrete to abstract both in the content and in the feedback is an outstanding feature.

Very usable, educationally sound programs are provided at a very reasonable price. The ability to make a backup copy enhances the use in a primary classroom.

STATUS

COUNT AND ADD has been designated as a SUPPLEMENTARY learning resource.

PURCHASE INFORMATION

This package may be purchased for $24.95 U.S. (Oct. 1983) from EduSoft at the address given at the beginning of the report.

Defective diskettes will be replaced without charge within a 90 day warranty period.

There is no warranty for disks which become inoperable through normal use however a backup copy may be made.

As the disk is accessed every time a new program is required, and as the programs are of short duration, a disk may be used with only one computer at a time.

COUNTING BEE

DESCRIPTION

Disk Title: Counting Bee
Producer: Edu-Ware Services
Address: P.O.Box 22222, Agoura, California, 91301
Users : Ages 4-8
Contents: 1 disk, guide (13p)
Topics: Counting, addition, subtraction, shape discrimination, weight and measure.
Other Formats Available (not evaluated): Atari

Version: 1.1
Cost: $29.95 U.S.
Tel. #: (213) 706-0661
Subject: Mathematics
Format: Apple II+, IIe

OBJECTIVES

Counting Bee is designed to introduce basic numeric and quantitative concepts to children in kindergarten to grade 3.

CONTENT DESCRIPTION

The disk consists of 8 modules controlled by a management system. The modules are: Counting Blocks, Counting Moving Circles, Mixed Height, Water Height, Comparing Weights, Comparing Lengths, Simple Addition and Simple Subtraction. The addition and subtraction modules involve single digits only.

Questions are posed using high resolution graphics which require the user to count various shapes and/or add shapes. The user is given one chance to enter a response. If that response is correct, positive reinforcement is given. If incorrect, the feedback shows how the correct answer is derived. No reading skills are required.

CONTENT EVALUATION

The sequence, range and depth of the content are appropriate for pre-school and grade 1 students but they may be inappropriate for older students.

INSTRUCTIONAL FORMAT DESCRIPTION

In the addition and subtraction modules, the user enters the appropriate numerical answer. In the other modules, the user selects from a number of alternatives by manipulating the space bar until the correct response is indicated.

Graphics and sound reinforce correct answers. Incorrect answers receive an "unhappy" face and a buzz along with corrective feedback. For example, the blocks may be counted for the student.

The sequence and the number of questions may be controlled by the teacher using the management system.

INSTRUCTIONAL FORMAT EVALUATION

The instructional design is effective for grade 1 students. No reading ability is needed and the feedback is particularly good. The types of control are also effective except where noted in the comments on the management system.

Only one attempt is provided for each question. As a result, the student does not have a chance to correct a typing error.

TECHNICAL DESIGN DESCRIPTION

High resolution color graphics are used in posing the question and in reinforcing the answers. Sound is also used in the reinforcements.

TECHNICAL DESIGN EVALUATION

The technical design is generally effective. The displays are appropriately designed for the target audience. The program is easy for the student to use after (s)he has been introduced to the operation of the keys. The sound may be distracting to other students in the class.

(Over)

MANAGEMENT SYSTEM DESCRIPTION

The teacher may access the following management system functions.

1. Change mode: The program can operate in a drill or demonstration mode.
2. Add/Change learning sequence: The teacher may select the modules and their order of presentation.
3. Trials per module: The number of questions in each module may be set from 2 - 99.
4. Change learner: The new learner must be entered at the beginning of each new sitting.
5. Scoreboard: The results of the most recent user are given for each module attempted. The teacher may maintain or purge the file.

The capacity of the entire file is not given. The system basically works for one student at a time.

MANAGEMENT SYSTEM EVALUATION

The operation of the management system is relatively easy. There are, however, a number of weaknesses in the design:

1. Once a student begins, (s)he continues on the predetermined sequence. If (s)he wishes to quit before the sequence is completed, that is possible, however, his/her sequence is not stored. Thus, the next time the user wishes to use the disk, the sequence must be re-entered.
2. Everytime a new student uses the disk, the management system must be changed. This could entail only changing the name of the user and maintaining the same sequence, but it still involves the teacher having to return to the computer for each user. If individual programs are to be set up, the teacher must spend more time. There is no way of entering the sequence for all the students ahead of time.
3. The scoreboard shows the scores for the current user only. The file of a previous user is not available.

The management system works but its design severely limits the usefulness of the disk in a primary classroom.

SUMMARY STATEMENT

The content, instructional format and technical quality are all good for students in grade 1. Older students may also benefit from it for remediation. The management system provides some flexibility for the teacher in setting up individualized programs for each student (sequence of units, number of questions), but the practical application of the system will require frequent attention by the teacher.

STATUS

COUNTING BEE has been designated as a SUPPLEMENTARY learning resource.

PURCHASE INFORMATION

In Alberta, this package may be purchased for $37.90 (Oct. 1983) from D&A MicroComputers, Box 1295, High River, T0L 1B0, 652-2485. Local dealers may also market the product.

Defective diskettes will be replaced without charge within a 30 day warranty period.

There is no warranty for disks which become inoperable through normal use.

As the content is managed, a disk may be used with only one computer at a time.

MATH ACTIVITIES COURSEWARE 6

DESCRIPTION

Disk Title: Math Activities Courseware 6 (MAC6)
Producer: Houghton Mifflin Canada Ltd.
Address: 150 Steelcase Road West, Markham, Ontario, L3R 1B2
Users : Grade 6
Contents: 3 disks & backups, teacher's guide, worksheet & suggested activities (62p)
Topics: Logic, metrics, estimation, operations with whole numbers, decimals and fractions
Additional Hardware/Software Requirements: Color monitor desirable
Other Formats Available (not evaluated): Commodore 64, IBM PC; a French version is also available for the Apple

Version: 1983
Cost: $225
Tel. #: (416) 495-1755
Subject: Mathematics
Format: Apple II+, IIe

OBJECTIVES

To develop and strengthen problem solving strategies, provide experience in estimation and concept development and to reinforce basic skills.

CONTENT DESCRIPTION

MAC6 contains 15 programs designed in a game mode. Each of the activities is intended to meet certain objectives related to a central concept from one of the units in the Houghton Mifflin Mathematics textbook. The courseware is intended to supplement the textbook and not to stand alone.

The games are designed so that individuals or groups may play against the computer or against each other. Many of the activities are open ended thus permitting involvement at varying levels of sophistication. In addition, interaction within a group in the determination of appropriate strategies is encouraged.

The topics of the games are as follows:

DECIMAL HUNT: A comparison of decimals involving searching methods and logical deduction.
MASTER MATH: Reinforcement of inverse operations and basic skills in subtraction.
MULTI-TARGETS: Estimation of answers for whole number multiplication.
TUG-OF-WAR: Estimation of answers for whole number division.
METRIC PATH: Estimation skills involving centimeters.
NUMBER STUMPER: Relationships between common factors and common multiples.
FRACTION DUET: Comparison of fractions and decimals.
MULTI-MAZE: Determination of a decimal product and placement of the decimal.
MAKING SENSE OF PERCENTS: Three estimation strategies for finding percents of whole numbers.
FRACTION CHALLENGE: Multiplication and division of fractions with reduction.
LEARNING THE ANGLES: Angular measurement.
SLIDE-FLIP-TURN: Practice in sliding, flipping and turning geometric figures.
SKETCH A PICTURE: Location of points and paths on a full coordinate plane.
FRACTION HUNT: Estimation of sums and differences involving fractions.
FRACTION SCALE: Interpretation of distances on a scale drawing.

User support materials consisting of worksheets and activities are provided for each game.

CONTENT EVALUATION

The content, sequence and level of difficulty are appropriate to the grade 6 Alberta curriculum with the exception of the programs involving fractions which would be more appropriate for enrichment. Also, the program "Sketch A Picture" is too challenging for most grade 6 students and instruction in locating points and paths on a full coordinate plane would have to be given prior to this program's use.

It is noted that the courseware is not designed to stand alone but rather to be used with the Houghton Mifflin grade 6 math text. The programs fulfill these objectives very well. In fact, they would be useful with any authorized grade 6 textbook.

(Over)

The user support materials are very good and can be used as extension activities or as parts of lessons leading up to the computer activities.

The content is current and metricated. The programs strengthen problem solving strategies, estimation and basic skills development in an interesting and appealing manner.

INSTRUCTIONAL FORMAT DESCRIPTION

Interaction with the computer consists of answer entry as well as menu selections and the designation of the number of players. Interaction within the group in discussing strategies can be productive and is encouraged.

Feedback techniques vary from one program to another but almost all are presented graphically with the use of sound. Examples of feedback include clues as to how close one is to the answer, an accuracy comparison of an estimation, elimination or addition of obstacles, awarding of points, ending of turns, etc. Graphical positive feedback motivates the student to get the answer correct.

INSTRUCTIONAL FORMAT EVALUATION

The instructional techniques used in these programs are appropriate for the target audience. They are effective and stimulating. Students participate actively and can compete with other students or with the computer.

The non-threatening and immediate feedback is very appropriate. Graphics, text and sound are all used to advantage. However,it should be noted that no help or explanation is given for incorrect answers. Students having difficulty with the concept or with the strategies involved may find certain games frustrating. As there are no explanations on how to play the games on the disks, students who are playing a game for the first time may also be frustrated.

TECHNICAL DESIGN DESCRIPTION

Graphics are an essential component of the programs. Color is also used but a color monitor is not essential. Sound is optional and is controlled by the teacher.

TECHNICAL DESIGN EVALUATION

The technical design of the programs has been done very well. The displays are appropriate, accurate and generally effective. The text is clear and easy to read. Generally, the transition from one display to another is very good.

Graphics, color and sound motivate the user. The program is easy to use and the user can readily leave the program.

SUMMARY STATEMENT

The major strength of this package lies in its stress on the development of problem solving strategies, logical thinking and estimation. The game approach is very good as it keeps the user interested and motivated.

One weakness is the lack of instructions on how to play the games. This necessitates prior teacher instruction on how to use the programs. Also, some students will find the problem solving strategies difficult to master. Some of the games are quite challenging and the lack of corrective feedback/help could frustrate some users.

STATUS

MATH ACTIVITIES COURSEWARE 6 has been designated as a RECOMMENDED learning resource.

PURCHASE INFORMATION

The commercial list price is $225 but schools may purchase it from the School Book Branch for $155.81 (Oct. 1983) (S.B.B. list price of $183.30 - 15%).

Defective diskettes will be replaced without charge within a 30 day warranty period. Note that the package contains backup diskettes.

Disks which become inoperable through normal use may be returned to the S.B.B. and replaced for $16.58 ($19.50 - 15%). There is no time limit for this warranty.

A disk may be used with more than one computer at a time if only one game is accessed. The disk is required to change games.

LASER CHASER

DESCRIPTION

Disk Title: Laser Chaser
Producer: Indian Head Software
Address: 1002 Indian Head Drive, Snow Hill, North Carolina, 28580
Users : Junior High (inferred)
Contents: 1 disk
Topics: Addition, subtraction and multiplication of integers
Other Formats Available (not evaluated): Available in Apple format only

Version: 1981
Cost: $15.95 U.S.
Tel. #: (919) 747-2839
Subject: Mathematics
Format: Apple II+, IIe

OBJECTIVES

This disk is designed to provide drill and practice in the application of integer operation rules involving addition, subtraction, and multiplication. (Inferred)

CONTENT DESCRIPTION

In "Laser Chaser" the user must correctly answer questions dealing with addition, subtraction and multiplication of integers within the -5 to +5 range. The student can choose whether to have his/her responses timed or untimed. If a timed response is chosen, it is possible to have the time limit gradually reduced or to begin at a fast rate immediately.

The program is presented in game format. The user must determine the answer, locate a cannon over the correct digit on a number line (using the arrow keys) and fire at an invisible ship using the "F" key. If the correct answer is selected, the phantom cruiser is destroyed and the user is awarded 200 points. An incorrect answer results in loss of points. As points are gained, the user's rank increases from private to corporal and upward. The rank of "Commander" is earned at 5000 points. If this ranking is achieved in all three games in one sitting, the user becomes "Supreme Commander". A student may exit the program at any time but will sacrifice accumulated points. There is no management system to record points beyond the current sitting.

Weaker students may choose to move their cannon along the number line in steps in order to determine the correct answers in the untimed games.

CONTENT EVALUATION

The range, although limited, is quite sufficient for the objectives of the game. The intent is not to do long cumbersome arithmetic, but rather to apply integer operation rules quickly.

With the limited range, there is no sequence from easy to difficult. However, a student does have the choice of three operations and timed/untimed games. These choices make the game applicable for weak and strong students. The ability to work the answer out on the screen by making movements along the number line is another advantage.

Depth is satisfactory.

There are no user support materials but this is not a handicap as the game is simple and easy to learn. Questions are clear and the content is consistent with the grade 8 unit on integers.

INSTRUCTIONAL FORMAT DESCRIPTION

The instructional technique is a drill and practice game utilizing random questions within a specific range. Only one attempt per question is given. Positive feedback is achieved by awarding points and rank. If an answer is incorrect, the opponent become visible and destroys the correct number on the number line. Points also are deducted. Quantitative feedback is given when 5000 points have been accumulated.

INSTRUCTIONAL FORMAT EVALUATION

The student generally has good control of the program. (S)he can read/bypass directions, return to them at any time, and in the untimed choice, control rate by pressing return.

Feedback is generally good as multiple feedback methods are used (graphics, points counter, sound, etc.). However, there is no corrective feedback provided.

Within the limitations of a game format, the instructional format is good.

TECHNICAL DESIGN DESCRIPTION

Graphics are used for the integer line, cannon, firing, bullet line, tokens, and the hidden force. Sound is used to designate a hit, a loss of points, or a misfire. The user can exit the program at any time and return to the menu.

TECHNICAL DESIGN EVALUATION

Graphics, sound and color are used effectively. The use of the same three keys for input lends itself well to two students playing together and helping each other out.

Apart from the possible distraction of the sound reinforcements, the technical design of the game is good.

SUMMARY STATEMENT

The major strength of this game is the fact that it is highly motivating and entertaining. Content range and sequence, while limited, are effective in achieving the objectives of the program. Although corrective feedback is not available, the instructional format of the game is satisfactory.

This game is effective in presenting drill on operations with integers in an interesting and motivating fashion. With judicious implementation by the teacher, this disk will prove useful in a classroom setting for students of all abilities.

STATUS

LASER CHASER has been designated as a SUPPLEMENTARY learning resource.

PURCHASE INFORMATION

This program may be purchased for $15.95 U.S. (Oct. 1983) from Indian Head Software at the address given at the beginning of the report.

An unprotected copy may be purchased for $47.85 (U.S.). Schools may then make as many copies of the product as they wish so long as the copies are used only within the one site. Copies of the disk may not be made and distributed throughout the school district.

Defective disks will be replaced without charge within a one year warranty period. After one year, the company will replace a disk damaged for any reason for $5 U.S.

As the disk is accessed at the end of each round (5000 points), it could be used in a number of computers at the same time but only one round could be played.

GERTRUDE'S PUZZLES

DESCRIPTION

Disk Title: Gertrude's Puzzles
Producer: The Learning Company
Address: 545 Middlefield Road, Suite 170, Menlo Park, California, 94025
Users : Age 6 and up
Contents: 1 disk, User manual (8p), 16 activity cards
Topics: Reasoning Skills
Additional Hardware/Software Requirements: Color Monitor, joy stick optional
Other Formats Available (not evaluated): Available in Apple format only

Version: 1982
Cost: $44.95 U.S.
Tel. #: (415) 328-5410
Subject: Mathematics
Format: Apple II+, IIe

OBJECTIVES

This disk is intended to motivate students in their acquisition of manipulative skills and in color and shape recognition. They will learn how to solve problems with incomplete information and analyze what they see by moving puzzle pieces to form color and shape patterns.

CONTENT DESCRIPTION

This program consists of three types of puzzles, each having two levels of difficulty. The student manipulates colored shapes to solve problems involving similarities and differences. Two of the puzzles require the user to arrange shapes according to a given rule. The third puzzle requires the user to decide what rule is being applied.

The disk includes an optional tutorial, instructions for each puzzle, examples of correctly completed puzzles, provision for the selection of different game shapes, and an editing feature whereby new shapes can be created. Support materials include a small student manual which explains the basic operating procedures and a set of 16 cards which can be colored and used to play one of the three games that are suggested on the activity cards.

CONTENT EVALUATION

Students from ages 6 and up would find this disk to be interesting and challenging. The content range, sequence and depth are appropriate and effective. The disk presents a wide assortment of combinations of various shapes and colors which add to the motivation of the puzzles. The accompanying manual lacks detail but does supply necessary operational information. The set of cards and games would be of some use with younger students.

INSTRUCTIONAL FORMAT DESCRIPTION

Student interaction consists of moving a joystick or a set of keys to move a graphic character (Gertrude the Goose), a rectangle (representing the learner), and various game pieces (colored shapes) around the screen. Numerous branches allow the user the choice of reading directions, selecting the type and number of puzzle to be played, viewing a treasure room, entering a shapes room, calling for help, etc.

Until the puzzle is accurately solved, the program considers it to be in the process of being solved. When a puzzle has been correctly solved, the lines surrounding the puzzle flash and Gertrude delivers a "treasure" (a graphic picture of a prize). After 12 prizes are accumulated, the student is awarded the title "Master Puzzler".

Students having difficulty are given some program help: in one puzzle, the student can press a space bar to make incorrectly placed pieces wiggle; in another, incorrect pieces "fall out" of the puzzle.

INSTRUCTIONAL FORMAT EVALUATION

This is an excellent program for the development of problem solving strategies. The program will recognize more than one correct solution to a problem. This enables the same puzzle to be re-solved a number of times without loss of motivation and student creativity is encouraged.

Feedback techniques could be improved by including help for the student who is having difficulty solving a puzzle or understanding instructions. In addition, older students may not be motivated by the prizes. It is unlikely that many students could be "Master Puzzlers" because of the time needed to solve 12 puzzles.

Students will require good psychomotor skills. An equal amount of time is spent on these skills as on the development of logic and pattern recognition. Students may find that the games are very time consuming in the movement of objects but this did not appear to lessen the enthusiasm of test students.

The shapes editing feature is time consuming and unnecessary. Students would probably enjoy creating new shapes but these are not necessary for the development of problem solving abilities and all new shapes are lost when the computer is turned off.

The number of branches and types of control are effective in meeting the needs of the user, however the teacher has no control over the program. It is unfortunate that the program doesn't include a management system to keep track of students' names, types of puzzles played and the number of puzzles correctly solved.

TECHNICAL DESIGN DESCRIPTION

Graphics and color are employed throughout the programs. Optional sound occurs in the title page (a brief tune), when pieces are picked up or dropped (a beep), and when a puzzle has been solved (a tune).

TECHNICAL DESIGN EVALUATION

Color, graphics and sound are generally appropriate and effective. While the displays are clear and well laid out, the vocabulary may be too difficult for young, first-time users. Also, it is easy to accidentally slip out of the page being used and into another but movement back in is accomplished with little effort. Some of the "doors" through which the student must move are not clearly labelled necessitating reference to the map in the student manual or learning through trial and error.

In order to avoid the tutorial and access the puzzles, the learner must demonstrate that (s)he knows how to manipulate the objects. This is accomplished by picking up and inserting a key into a lock. As exact placement is required, this may cause problems even for older users.

The specific sequence of steps that must be completed before a puzzle can be played may be confusing to first-time users. Teachers must be prepared to provide help for these students. Once a user is familiar with the map lay-out and the required movements, it is easy to progress through the program.

SUMMARY STATEMENT

Fine technical design and good user control make these puzzles interesting and challenging. They require a lot of thought and will definitely assist in the development of problem solving skills.

Weaknesses include the lack of helping branches, clues or strategy suggestions and the fact that teachers will likely have to assist younger and less capable students.

STATUS

GERTRUDE'S PUZZLES has been designated as a SUPPLEMENTARY learning resource.

PURCHASE INFORMATION

This package may be purchased for $44.95 U.S. (Oct. 1983) from The Learning Company at the address given at the beginning of the report. It may also be purchased from S.E.S. Distributing Inc., 366 Adelaide Street East, Toronto, Ontario, M5A 3X9, (416) 366-4242. There, the price of an individual disk is $55.95 (Oct. 1983). Schools receive a discount of 5% (for orders less than $100), 10% ($100-$1000) or 15% (greater than $1000). Local dealers may also market the product.

Defective diskettes will be replaced without charge within a 90 day warranty period.

Disks which are damaged by the user will be replaced for $10 U.S. upon return of the diskette to The Learning Company (distributors may not necessarily honor this warranty). This includes disks which wear out through normal wear and tear. There is no time limit for this warranty.

The entire program is loaded during the initial boot and this will allow a single disk to be used in a number of computers.

GERTRUDE'S SECRETS

DESCRIPTION

Disk Title: Gertrude's Secrets
Producer: The Learning Company
Address: 545 Middlefield Road, Suite 170, Menlo Park,California, 94025
Users : Ages 4-9
Contents: 1 disk, 1 User's Manual (8p), Activity Cards
Topics: Problem solving
Additional Hardware/Software Requirements: Color Monitor, joystick optional
Other Formats Available (not evaluated): Available in Apple format only

Version: 1982
Cost: $44.95 U.S.
Tel. #: (415) 328-5410
Subject: Mathematics
Format: Apple II+, IIe

OBJECTIVES

This disk is intended to motivate students in their acquisition of manipulative skills and in color and shape recognition. They will learn how to create order and to plan ahead by solving puzzles that involve arranging game pieces according to a given rule or by guessing a secret rule.

CONTENT DESCRIPTION

This program consists of three types of puzzles, each having two or three levels of difficulty. The child manipulates colored shapes to solve problems involving similarities and differences. Two of the puzzles require the student to arrange shapes according to given rules. The third puzzle requires the student to decide what rule is being applied (intersection of sets). The program includes seven rule pages giving instructions for each puzzle, five sample pages showing what a correctly completed puzzle looks like, a branch allowing for the selection of different shapes with which to play, an editing feature whereby new shapes can be created by the teacher or learner and an optional tutorial. There is also a small student manual to aid in learning the basic operating procedures and a set of 16 cards that can be colored and used to play one of the three games that are suggested on the two activity cards.

CONTENT EVALUATION

The content is appropriate and effective in its sequence and is accurate, clear and unbiased. The range and depth are most appropriate for grade 1 and early grade 2 students. The upper end of the target audience (8-9 year olds) will likely find most of the puzzles too easy.

INSTRUCTIONAL FORMAT DESCRIPTION

Student interaction consists of using a joystick or set of keys to move a graphic character (Gertrude the Goose), a rectangle (representing the learner), and various game pieces (colored shapes) around the screen. By moving the goose and the rectangle through various "doors", the student selects the puzzle to be played and may opt to see a set of printed instructions, a completed sample puzzle, choose the game pieces with which to play, or alter existing pieces to create new shapes.

When a puzzle has been solved, positive feedback consists of the lines surrounding the puzzle flashing and Gertrude delivering a "treasure" to the "treasure room". A solution is never evaluated as being incorrect. Until a puzzle is accurately solved, the program considers it to be in the process of being solved.

There are some clues available to aid the player who is having difficulty solving a puzzle. In two of the puzzle types, incorrectly placed pieces will "fall out" of the puzzle.

INSTRUCTIONAL FORMAT EVALUATION

This is a good program for the development of problem solving strategies in young students. Since the program recognizes different possible solutions, it encourages student creativity and enables re-solving the puzzles a number of times without loss of motivation. The instructional technique, student interaction, and evaluation techniques are appropriate and effective. However, the feedback techniques are lacking in that the program has only a few provisions for aiding the student who is having difficulty solving a puzzle or understanding instructions.

The shapes editing feature is time consuming and unnecessary. Students would enjoy creating new shapes but these are not necessary for the development of problem solving abilities, and all created shapes are lost when the computer is turned off.

It is unfortunate that the program doesn't include a management system to keep track of students' names, types of puzzle played and the number of puzzles solved.

TECHNICAL DESIGN DESCRIPTION

Graphics and color are employed in the design of the map, the puzzle, Gertrude the Goose, the shapes used for playing and the treasures won. Sound, which is at the user's control, occurs in the title page (a brief tune), when pieces are picked up or dropped (a beep), and when a puzzle has been solved (a tune).

TECHNICAL DESIGN EVALUATION

On the whole, color, graphics and sound are appropriate and effective, however, there are a few problems. Although the displays are clear and well laid out, the vocabulary may be too difficult for young, first-time users. It is easy to accidentally slip out of the page being used and into another, but movement back in is accomplished with little effort. Some of the "doors" through which the student must move are not clearly labelled and so the student must either refer to the map in the student manual or learn through trial and error.

Generally teachers must be prepared to provide help for first-time users and younger students.

SUMMARY STATEMENT

These puzzles with their motivating technical design and thought provoking puzzles are particularly suited to the development of problem solving skills in the middle target audience range. The lack of strategy suggestions for students experiencing difficulty is the chief weakness and teacher assistance will be required.

STATUS

GERTRUDE'S SECRETS has been designated as a SUPPLEMENTARY learning resource.

PURCHASE INFORMATION

This disk may be purchased for $44.95 (U.S.) (Oct. 1983) from The Learning Company at the address given at the beginning of the report. It may also be purchased from S.E.S. Distributing Inc., 366 Adelaide Street East, Toronto, Ontario, M5A 3X9, (416)-366-4242. There, the price of an individual disk is $55.95 (Oct. 1983). Schools receive a discount of 5% (for orders less than $100), 10% ($100-$1000) or 15% (greater than $1000). Local dealers may also market the product.

Defective disks will be replaced without charge within a 90 day warranty period.

Disks which are damaged by the user will be replaced for $10 U.S. upon return of the diskette to The Learning Company (distributors may not necessarily honor this warranty). This includes disks which wear out through normal wear and tear. There is no time limit for this warranty.

Teachers will appreciate the fact that the entire program is loaded during the initial boot which allows a single disk to be used in a number of computers.

MATH SKILL GAMES

DESCRIPTION

Disk Title: Math Skill Games
Producer: McGraw-Hill Ryerson Ltd.
Address: 330 Progress Ave., Scarborough, Ontario, M1P 2Z5
Users : Elementary Students
Contents: Disk, back up disk, teacher's guide (80p), reproducible result sheets
Topics: Addition, subtraction, multiplication and division of whole numbers
Other Formats Available (not evaluated): PET, TRS-80 III

Version: 1982
Cost: $80.15
Tel. #: (416) 293-1911
Subject: Mathematics
Format: Apple II+, IIe

OBJECTIVES

To provide drill and practice within a game format on simple addition, subtraction, multiplication and division calculations. (Inferred)

CONTENT DESCRIPTION

The disk consists of 12 games divided into three levels. These are:

LEVEL I: Beat the Champ, Bowling, Space War, and Speed Racer
LEVEL II: Math Track, 'Mazing Facts, Rocket Builder, and Pit
LEVEL III: Beat the Superchamp, Blast Off, Magic Number and Math Concentration

The four games in Level I provide both timed and accuracy drills on addition and subtraction to 10, multiplication to 25 and division to 45. Multiplicands and divisors range from 2-5.

In Levels II and III the upper limits are raised to 18 for addition and subtraction and to 81 for multiplication and division.

Each level has at least one game which is untimed. The number of questions asked in the timed drills depends upon the user's rate of response. At each level the user can choose the operation to be drilled and the mode of competition (individual, individual against the computer, or student A vs. student B). An optional student worksheet is provided for each game.

CONTENT EVALUATION

The disk content corresponds well with the Alberta curriculum. Content range, sequence and depth are all appropriate within the confines of the game format. The sequence from level to level is logical and the drill for basic facts is good. The teacher's guide outlines the correlation of the disk with 6 math basal series (McGraw Hill Mathematics, Mathematics in Our World, Heath Mathematics, Holt Mathematics, Macmillan Mathematics and Scott,Foresman Mathematics).

There are a number of weaknesses. The drills are presented in a game format and as a result there is no instructional component. There are certain areas of vagueness, for example, students using the bowling program will understand the scoring better if they have had experience with the game of bowling. Also, the effect of correct answers in the game "Blast Off" is initially hard to determine. Student support materials are of limited value.

INSTRUCTIONAL FORMAT DESCRIPTION

The student enters numerical answers to basic questions and presses the space bar to activate the next screen. Questions are randomly selected within given parameters with the number of questions varying from game to game. Positive/negative feedback reports also vary from one game to the next, but they generally consist of some type of message, a graphics display, and a score.

The user initially controls sequence via menu selection; however once a program is begun, rate, sequence and amount are generally program controlled.

(Over)

INSTRUCTIONAL FORMAT EVALUATION

Interaction and user control are appropriate for the concepts presented.

Questioning techniques could be improved. An exceedingly poor random number generator produces a question sequence that often repeats questions which have already been posed. Questions are repeated whether the questions were answered correctly or not.

Positive feedback is quite good and the use of graphics is motivational. However, quantitative feedback is minimal and negative feedback varies from providing the correct answer unduly quickly to being virtually non-existent. There is no corrective feedback.

Users may tend to become quickly bored with individual programs as the objectives are so limited, however a wide choice of programs partly alleviates this difficulty.

TECHNICAL DESIGN DESCRIPTION

The games can be run on either a color or a monochrome monitor. Characters are generated in high resolution graphics. Minimal use is made of sound.

TECHNICAL DESIGN EVALUATION

The technical design is generally good. Displays are clear, uncluttered and error-free. Material which is timed is consistent in that time period.

The programs will work on green screens or on black and white monitors, however, the color graphics enhance the viewing esthetics.

SUMMARY STATEMENT

Within the restrictions of a game format, this program provides good practice in basic facts. The graphics and competitive format are highly motivational. Poor questioning techniques, inadequate negative feedback, high cost and lack of branching are the major weaknesses.

This package's most likely application is for motivational practice. The content range and instructional design are not appropriate for frequent use. However, as a motivational device and as a tool for providing reasonable drill, this disk has potential for profitable use in the classroom.

STATUS

MATH SKILL GAMES has been designated as a SUPPLEMENTARY learning resource.

PURCHASE INFORMATION

This package may be purchased for $80.15 (Oct. 1983) from McGraw-Hill Ryerson at the address given at the beginning of the report.

Defective disks will be replaced without charge within a 60 day warranty period.

There is no warranty for disks which become inoperable through normal use. Note that the package does come with a backup diskette.

This disk may be used with more than one computer at a time if only one game is accessed. The disk is required to change games.

ELEMENTARY VOLUME 1

DESCRIPTION

Disk Title: Elementary Volume 1
Producer: Minnesota Educational Computing Consortium (MECC)
Address: 2520 Broadway Drive, St. Paul, Minnesota, 55113
Users : Grades 1-6
Contents: 1 disk, teacher's guide (70p)
Topics: Metric system, rounding, estimation, number logic and basic facts
Other Formats Available (not evaluated): Atari

Version: 3.4
Cost: $40.00 U.S.
Tel. #: (612) 376-1118
Subject: Mathematics
Format: Apple II+, IIe

CONTENT DESCRIPTION

This diskette contains 11 programs in either a game or a drill and practice format. The programs are:

1. Bagels (grades 3-6): Bagels is a number game in which the computer "thinks" of a two, three or four digit number. Students guess a number and the computer presents clues to any digits in their guess that are in the secret number.

2. Making Change (grades 3-5): This program drills students on the correct procedure for making change. The objectives are to learn a system for making change and to learn to make change based on knowing the cost of an item and the amount of money to be worked with.

3. Hurkle (grades 2-6): Students attempt to find a "Hurkle" hidden on a grid or number line with the aid of computer directional clues (south, west, etc.). Students can work through three levels using a vertical number line, a horizontal number line, a 10 x 10 grid, or a -5 to +5 grid.

4. Metric Length (grades 5-6): This program drills students on converting units within the metric system using millimeters, centimeters, meters and kilometers.

5. Metric Estimate (grades 2-6): Students are given a line segment and are asked to estimate its length in centimeters or millimeters.

6. Metric 21 (grades 2-6): Students play a game of metric Blackjack with the computer using line segments from 1 to 10 centimeters long. Students attempt to determine when their line segments add up to 21 centimeters.

7. Number (grades 1-5): Students try to guess the number that the computer has chosen with the assistance of clues ("too big" or "too small").

8. Round (grades 4-6): This program provides drills on the concept of rounding. The number must be rounded to the nearest ten, nearest hundred or nearest thousand.

9. Speed Drill (grades 2-6): This program drills on addition, subtraction, multiplication and division problems. Students can choose the level of difficulty, the number of problems and the operation to be practiced.

10. Taxman (grades 5-6): This game gives students practice in identifying factors of a number, and prime and composite numbers. Students choose a number from a list and the "taxman" gets all the factors of that number.

11. Tens (grades 5-6): After students select the time limit and the number of questions, the computer generates a drill which requires the user to multiply numbers that have trailing zeroes.

The teacher's guidebook contains background information, operational instructions, sample exercises and follow-up activities.

CONTENT EVALUATION

The contents are congruent with some of the basic concepts prescribed for Division II mathematics, but the scope of the total package is limited.

The content is clearly presented and is basically accurate with a few minor errors ("Making Change" makes use of half dollars and metric units are not consistently SI).

The teacher support materials are very good.

INSTRUCTIONAL FORMAT DESCRIPTION

The student interaction consists of selection from a menu of 11 activities and input of responses in the games and drills. Also, there is often selection of difficulty level and/or number of questions.

Questions are randomized within the parameters of the game/drill.

There is on-going feedback in most of the programs and many have display results and reward messages.

INSTRUCTIONAL FORMAT EVALUATION

Negative feedback, when it exists, provides only the answer. No corrective feedback is available. Otherwise, the instructional format is generally good for the intents of the program and for the target audience.

TECHNICAL DESIGN DESCRIPTION

A large character set is used for print displays. High resolution graphics are also used in graphical displays. Color is used but is not essential.

TECHNICAL DESIGN EVALUATION

Generally, the technical design is appropriate for the target audience and is well done.

SUMMARY STATEMENT

The programs on this disk have a number of minor weaknesses. Negative feedback is quite minimal and SI metric is not followed consistently. Also, there is no real sequence of programs on the disk - they touch a number of concepts here and there.

However, the programs are technically good and simple for the student to use. Minimal teacher supervision is required. The programs are not intended to introduce a concept but rather to serve as enrichment or remediation after the concept has been taught by the teacher. The low cost and the potential for use throughout the elementary grades make it very attractive.

STATUS

ELEMENTARY VOLUME 1 has been designated as a SUPPLEMENTARY learning resource.

PURCHASE INFORMATION

As part of the MECC license, Alberta schools may purchase this disk for $8.00 (Oct. 1983) from ACCESS, 295 Midpark Way, S.E. Calgary, Alberta, T2X 2A8, (403) 256-1100. The teacher's guide costs an additional $3.00.

If only one program on the disk is to used at one sitting, the program can be loaded into several computers. However, if the full contents of the disk are to made available to students, the need to access the disk after each game/drill will require one disk for each computer.

EQUATIONS

DESCRIPTION

Disk Title: Equations
Producer: Microcomputer Workshops
Address: 225 Westchester Ave, Port Chester, New York 10573
Users : Grades 7-11
Contents: 1 disk, guide (1p)
Topics: Equations of the form Ax + B = C
Other Formats Available (not evaluated): Commodore 64, Pet, TRS-80, Atari

Version: 1982
Cost: $24.95 U.S.
Tel. #: (914) 937-5440
Subject: Mathematics
Format: Apple II+, IIe

OBJECTIVES

To give students in grades 7-11 drill and practice in solving equations of the type Ax + B = C.

CONTENT DESCRIPTION

The program provides drill and practice on the procedures for solving simple linear equations.

The program contains a set of instructions on how the screen will look, the operations that the user may choose and how a problem may be solved using the program. These instructions deal with running the program and do not involve explanations on the concepts involved.

Following the instructions, the user is given random equations with integer solutions. In order to solve the problem, the user must select from a list of operations (addition, subtraction, multiplication, division and simplification). Upon inputting the correct operation, (s)he must then perform the operation. The computer modifies the equation appropriately and then resumes the solution process.

The user decides at the end of each problem whether another question is to be posed.

CONTENT EVALUATION

The instructions are intended to demonstrate how to use the program. The lack of depth and clarity make them inadequate for teaching the concept to a student who has not had prior instruction.

The range and sequence of the content are very limited in that only one small skill is addressed and there is no development of sequence within that objective. While that one operation has been covered well, the value of the disk would be greater with a wider range. The depth of the practice is satisfactory as the user may select as many questions as (s)he desires.

The structured problem solving strategy is a strength to the program.

The content is not particularly applicable to the designated target audience (grades 7-11). Except at grades 7-8, the depth and range of the coverage do not provide much challenge and the program would be useful in the higher grades for remediation only.

The program is basically remedial in nature and requires previous instruction in the concept. For that purpose, the content is well developed.

INSTRUCTIONAL FORMAT DESCRIPTION

The student works through a problem step-by-step by identifying appropriate processes and entering the needed changes. Correct answers to the sub-questions result in the program proceeding through the solution process until an answer is obtained. Errors in either the selection of the correct operation or in the input of terms result in a brief remedial statement. These statements may direct the user to the correct operation or may show a correct simplification. The correct answer must be entered before the user can proceed. The program will accept different forms of the correct answer, e.g. adding -3 or subtracting 3.

At the end of each question, quantitative feedback is given showing the number of procedural errors and the number of computational errors.

The rate and number of questions are controlled by the user. Questions are randomized and the user may do as many as (s)he wishes.

INSTRUCTIONAL FORMAT EVALUATION

The student interaction in the drill is effective and clear. As the user participates through a very structured problem solving approach, this program would be best for remedial purposes. After a user has mastered this skill, the continued repetition of the structured questions could become tedious.

The feedback on errors is good as corrective feedback is used to explain why an error was made. Error trapping has been well designed and common errors are all anticipated.

Quantitative feedback, while available, does not provide the teacher with specific areas of difficulty. Quantitative feedback on the entire drill including the number of questions attempted would be advantageous.

Another weakness is the lack of an evaluation component (pre-test/post-test) and the lack of different levels of difficulty. These would provide more flexibility in dealing with students with varying abilities.

In general, the instructional format of this drill is good.

TECHNICAL DESIGN DESCRIPTION

Text and numbers are presented in standard size print, upper case letters only. During the solution of the question, the screen is broken into two areas: original problem and work space. As the question is solved, the work space is modified but the original question remains untouched.

The inverse mode is used to highlight important pieces of information.

TECHNICAL DESIGN EVALUATION

The screen is easy to read, but building and maintaining the full solution of the equation on the screen would have been desirable.

The technical design of the program is satisfactory.

SUMMARY STATEMENT

This program meets its specific objective very well. Content depth and feedback techniques are both very good. The disk is very user friendly and could be used with minimal teacher supervision. The methodical step by step approach used to solve the problems requires the student to actively participate in the solution. This is an excellent program for remediation.

The limited content range is a disadvantage and the structured approach may be boring to students who have the necessary skills. Students may find the absence of all the steps in the solution to be confusing. Also the quantitative feedback could provide more information to the teacher.

These weaknesses are minor when compared to the overall quality of the program.

STATUS

EQUATIONS has been designated as a SUPPLEMENTARY learning resource

PURCHASE INFORMATION

This program may be purchased for $24.95 U.S. (Oct. 1983) from Microcomputer Workshops at the address given at the beginning of the report.

Defective disks will be replaced without charge within a 90 day warranty period.

Disks which become inoperable through normal use may be replaced for $10 U.S. upon return of the diskette. There is no time limit for this warranty.

Teachers will appreciate that fact that the entire program is loaded during the initial boot which allows a single disk to be used in a number of computers.

MULTIPLYING FRACTIONS

DESCRIPTION

Disk Title: Multiplying Fractions
Producer: Microcomputer Workshops
Address: 225 Westchester Avenue, Port Chester, New York 10573
Users : Grades 5-8
Contents: 1 disk, guide (2p)
Topics: Multiplication of common & improper fractions involving cancellation
Other Formats Available (not evaluated): Commodore 64, Pet, TRS-80, Atari

Version: 1982
Cost: $24.95 U.S.
Tel. #: (914) 937-5440
Subject: Mathematics
Format: Apple II+, IIe

OBJECTIVES

To give students in grades 5-8 drill and practice in multiplying fractions.

To facilitate the understanding of the cancelling or reducing process in order to simplify the problem.

CONTENT DESCRIPTION

The program provides drill and practice on the procedures for multiplying two fractions where cancellation may or may not be possible.

The program contains a set of instructions on how the screen will look, the operations that the user may choose and how a problem may be solved using the program. These instructions deal with running the program and do not involve explanations on the concepts involved. One example is provided.

Following the instructions, the user is given random multiplication problems. In order to solve the question, the user must decide whether to cancel/reduce or multiply. Upon inputting the correct operation, (s)he must then perform the operation. The computer modifies the question appropriately and then resumes the solution process. If possible, final answers are to be converted to mixed numbers.

The user decides at the end of each problem whether another question is to be posed.

CONTENT EVALUATION

The instructions are intended to demonstrate how to use the program. Their lack of depth and clarity would be inadequate to teach the concept to a student who has not had prior instruction.

The range and sequence of the content are very limited in that only one small skill is addressed and there is no development of sequence within that objective. While that one operation has been covered well, the value of the disk would be greater with a wider range. The depth of the practice is satisfactory as the user may select as many questions as (s)he desires.

The structured problem solving strategy is a strength of the program.

In Alberta the content is not particularly applicable to the designated target audience (grades 5-8) as this objective is no longer included in the grade 5, 6 or 7 curriculum. It may be applicable to grade 8 students.

The program is remedial in nature and requires previous instruction in the concept. For that purpose, the content is well developed.

INSTRUCTIONAL FORMAT DESCRIPTION

Correct answers result in the program proceeding through the solution process until an answer is obtained. Errors in either the selection of the correct operation or in the input of numbers result in a brief remedial statement. These statements may direct the user to the correct operation or may show a numerical calculation. The correct answer must be entered before the user can proceed.

At the end of each question, quantitative feedback is given showing the number of procedural errors and the number of computational errors. At the end of the drill, similar quantitative feedback is available for all the questions attempted.

The rate and number of questions are controlled by the user. Questions are randomized and the user may do as many as (s)he wishes.

INSTRUCTIONAL FORMAT EVALUATION

The student interaction in the drill is effective and clear. As the user participates through a very structured problem solving approach, this program would be best for remedial purposes. After a user has mastered this skill, the continued repetition of the structured questions could become tedious.

The feedback on errors is good as corrective feedback is used to explain why an error was made. Error trapping has been well designed and common errors are all anticipated.

Quantitative feedback, while available, does not provide the teacher with specific areas of difficulty. Also some mention of the total number of questions attempted should be included.

Another weakness is the lack of an evaluation component (pre-test/post test) and the lack of different levels of difficulty. These would provide more flexibility in dealing with students with varying abilities.

In general, the instructional format of this drill is good.

TECHNICAL DESIGN DESCRIPTION

Text and numbers are presented in standard size print, upper case letters only. During the solution of the question, the screen is broken into three areas: original problem, work space and messages. As the question is solved, the work space is modified but the original question remains untouched. The messages area provides instructions and information to the user.

The inverse mode is used to highlight important pieces of information.

TECHNICAL DESIGN EVALUATION

The screen has been well formatted. The use of the three parts allows necessary information to be retained, transformations to be shown clearly and messages to be clearly and efficiently shown to the user.

The technical design of the program is good.

SUMMARY STATEMENT

This program meets its specific objective very well. Content depth, feedback techniques and technical design are all very good. The disk is very user friendly and could be used with minimal teacher supervision. The methodical step by step approach used to solve the problems requires the student to actively participate in the solution. This is an excellent program for remediation.

The limited content range is a disadvantage and the structured approach may be boring to students who have the necessary skills. Also the quantitative feedback could provide more information to the teacher. These weaknesses are minor when compared to the overall quality of the program.

STATUS

MULTIPLYING FRACTIONS has been designated as a SUPPLEMENTARY learning resource.

PURCHASE INFORMATION

This package may be purchased for $24.95 U.S (Oct. 83) from Microcomputer Workshops at the address given at the beginning of the report.

Defective disks will be replaced without charge within a 90 day warranty period.

Disks which become inoperable through normal use may be replaced for $10 U.S. upon return of the disk. There is no time limit for this warranty.

Teachers will appreciate the fact that the entire program is loaded during the initial boot which allows a single disk to be used in a number of computers.

QUADRATIC EQUATIONS

DESCRIPTION

Disk Title: Quadratic Equations
Producer: Microcomputer Workshops
Address: 225 Westchester Avenue, Port Chester, New York 10573
Users : Grades 9-12
Contents: 1 disk, guide (3p)
Topics: Solving quadratic equations by factoring
Other Formats Available (not evaluated): Commodore 64, Pet, TRS-80, Atari

Version: 1982
Cost: $24.95 U.S.
Tel. #: (914) 937-5440
Subject: Mathematics
Format: Apple II+, IIe

OBJECTIVES

To give students in grades 9-12 drill and practice in solving quadratic equations by factoring.

To facilitate the understanding of the factoring process and of setting each factor equal to zero and solving as a separate equation.

CONTENT DESCRIPTION

The program provides drill and practice on the procedures for solving quadratic equations where the coefficient of the squared term is 1, 2 or 3.

The program contains a set of instructions on how the screen will look, the operations that the user may choose and how a problem may be solved using the program. These instructions deal with running the program and do not involve explanations of the concepts involved.

Following the instructions, the user is given random equations at one of two difficulty levels (A = 1; A = 2 or 3). In order to solve the problem, the user must select from a list of operations (divide both sides by a number, factor the left side, set each factor = 0 and solve). Upon inputting the correct operation, (s)he must then perform the operation with procedural assistance from the program. The computer modifies the equation appropriately and then resumes the solution process.

The user decides at the end of each problem whether another question is to be posed.

CONTENT EVALUATION

The instructions are intended to demonstrate how to use the program. Their lack of depth and clarity would be inadequate to teach the concept to a student who has not had prior instruction.

The range and sequence of the content are somewhat limited in that all coefficients are integers. However, two levels of difficulty are available and a well-designed tutorial on factoring is given to a student who is unsuccessful in two attempts. The depth of the practice is satisfactory as the user may select as many questions as (s)he desires.

The structured problem solving strategy is a strength to the program.

The program is basically remedial in nature and requires previous instruction in the concept. For that purpose, the content is well developed.

INSTRUCTIONAL FORMAT DESCRIPTION

Correct answers result in the program proceeding through the solution process until an answer is obtained. Errors in either the selection of the correct operation or in the input of terms result in a brief remedial statement. These statements may direct the user to the correct operation or may show a correct simplification. The correct answer must be entered before the user can proceed. If the user is unsuccessful in two attempts at factoring the equation, (s)he is sent to a tutorial where instruction in factoring is given.

At the end of each question, quantitative feedback is given showing the number of procedural errors and the number of computational errors. Similar quantitative feedback is given at the end of the drill.

The rate and number of questions are controlled by the user. Questions are randomized and the user may do as many as (s)he wishes.

(Over)

INSTRUCTIONAL FORMAT EVALUATION

The student interaction in the drill is effective and clear. As the user participates through a very structured problem solving approach, this program would be best used for remedial purposes. After a user has mastered this skill, the continued repetition of the structured questions could become tedious.

The feedback on errors is good as corrective feedback is used to explain why an error was made. Error trapping has been well designed and common errors are all anticipated.

Quantitative feedback, while available, does not provide the teacher with specific areas of difficulty or with the number of questions attempted in the drill.

The remedial branch on factoring adds an important dimension to the program. While this branch would not be successful for a student without prior instruction in factoring, it will provide assistance to those students who have a basic understanding of the process but need additional help.

The number of random questions generated seems to be rather restricted. Some students may have questions repeated.

In general, the instructional format of this drill is good.

TECHNICAL DESIGN DESCRIPTION

Text and numbers are presented in standard size print, upper case letters only. During the solution of the question, the screen is broken into three areas: original problem, work area and messages. As the question is solved, the work space is modified but the original question remains untouched. The messages area provides instruction and information to the user.

The inverse mode is used to highlight important pieces of information.

TECHNICAL DESIGN EVALUATION

The screen has been well formatted. The use of the three parts allows necessary information to be retained, transformations to be shown clearly and messages to be clearly and efficiently shown to the user.

The technical design of the program is satisfactory.

SUMMARY STATEMENT

This program meets its specific objective very well. Content depth and feedback techniques are both very good. The disk is very user friendly and could be used with minimal teacher supervision. The methodical step by step approach used to solve the problems requires the student to actively participate in the solution. This is an excellent program for remedial students.

The structured approach may be boring to students who have the necessary skills. Also the quantitative feedback could provide more information to the teacher.

These weaknesses are minor when compared to the overall quality of the program. This is a good program for remediation.

STATUS

QUADRATIC EQUATIONS has been designated as a SUPPLEMENTARY learning resource.

PURCHASE INFORMATION

This package may be purchased for $24.95 U.S. (Oct. 1983) from Microcomputer Workshops at the address given at the beginning of the report.

Defective disks will be replaced without charge within a 90 day warranty period.

Disks which become inoperable through normal use may be replaced for $10 U.S. upon return of the diskette. There is no time limit for this warranty.

Teachers will appreciate the fact that the entire program is loaded during the initial boot which allows a single disk to be used in a number of computers.

MATH SEQUENCES

DESCRIPTION

Disk Title: Math Sequences
Producer: Milliken Publishing Company
Address: 1100 Research Blvd. St. Louis, Missouri 63132
Users : Grades 1 - 8
Contents: 12 disks, teacher guide (55p), four duplication masters
Topics: Whole numbers, fractions, decimals, integers, percents, number readiness, equations & measurement formulae

Version: 1983
Cost: $550
Tel. #: (314) 991-4220
Subject: Mathematics
Format: Apple II+, IIe

Other Formats Available (not evaluated): Commodore Pet, Atari 800, TRS 80 Level II

OBJECTIVES

To provide drill and practice in arithmetic skills introduced in grades 1-8.

CONTENT DESCRIPTION

The package consists of 12 diskettes, one on each of the following: number readiness, whole number addition, subtraction, multiplication and division, laws of arithmetic, integers, fractions, decimals, percents, equations and measurement formulae. Each skill area is divided into a number of small problem levels that gradually increase in difficulty. Students progress through these levels based on performance. A demonstration of mastery results in advancement while failure results in regression to easier levels. The teacher has control over these and other parameters through the management system.

CONTENT EVALUATION

On the whole, the range of the content is appropriate and effective. The sequencing of the content is excellently done with small increments and a very orderly progression from one level to the next. It should be noted that these are drill exercises and no instruction in the skill/concept is provided.

A minor problem is the incorrect use of metric symbols. Also, there is improper decimal notation (e.g. .25 instead of 0.25). These weaknesses are not extensive.

INSTRUCTIONAL FORMAT DESCRIPTION

The bulk of the user's interaction with the program is through entry of numerical answers which are evaluated upon entry. In addition, the user may request help with renaming, may change quotient answers and may escape from the program early.

Feedback is provided in either textual or graphical mode as specified by the teacher. There is a variety of positive feedback messages, each of which lasts approximately three seconds before erasure is possible. Negative feedback occurs after the second error in a problem and consists of a flashing text statement followed by a demonstration of the solution. Quantitative feedback is provided through a series of letters and numbers at the bottom of each page and through narrative statements at the end of the drill.

Evaluation is done through embedded tests. The number of questions to be done and the mastery and failure levels can be specified by the teacher through the management system. A question is considered wrong on the second attempt. If only one error is made, the question is recorded as correct.

Students progress through the sequence of skills linearly. If they meet the criteria, the management system advances them to the next skill. They will automatically be dropped to an easier level if failure is met.

INSTRUCTIONAL FORMAT EVALUATION

There are a number of instructional format weaknesses:

1. The negative feedback shows the user how the correct answer is obtained but does not involve him/her in that lesson.

2. Positive reinforcement screens might be considered to be boring and time consuming.

3. Pre-tests and post-tests are not included. As a result, a student may not be placed at an appropriate level. Generally speaking, the better student's needs are not considered and this student may find the drills boring.

(Over)

4. Younger students may find the quantitative feedback coding to be confusing.

5. It may be considered inappropriate to allow a student who makes a mistake on each question to end up with the same score as a student who makes no errors.

6. The use of multiple choice questions (Measurement Formulae) allows the student to guess answers.

7. If a student hits two keys by accident, (s)he has no chance to correct the input.

Notwithstanding the above criticisms, the overall instructional format is satisfactory. While there is room for improvement, the package can be used effectively within a classroom setting.

TECHNICAL DESIGN DESCRIPTION

High resolution graphics are used to present large size numbers, mathematical symbols and positive reinforcement.

TECHNICAL DESIGN EVALUATION

The positive reinforcement graphics may be inappropriate and time consuming, particularly for older students. However, the teacher may elect to use text statements.

In the "Number Readiness" diskette, the graphics are slow in appearing and may be confusing because of the way they are printed on the screen.

In the "Equations" diskette, the fact that the equations are printed opposite to the way that they are read may be confusing and delaying.

Answers are not always entered from right to left.

Generally, graphics and display designs are appropriate and effective. The technical quality may be considered to be very good.

MANAGEMENT SYSTEM DESCRIPTION

Initialization, student management and class management functions are available. These include: making student assignments, specifying mastery/failure levels and the number of questions, making class assignments and reviewing class/student progress. In addition there are functions to add, list, delete students, etc. The management system resides on each diskette and has a capacity of five classes per diskette or a maximum of 100 students total.

MANAGEMENT SYSTEM EVALUATION

The system allows a teacher to specify a wide variety of student assignments and to receive a good deal of information about the student(s). The teacher using this system should be prepared to read the manual carefully and attempt some trial entries before full use. There is some confusion in making inputs, viewing the graphic results and making lists. List making is slow. A revised manual would be advantageous.

Another weakness inherent in the design is the fact the management system is on each diskette. While this saves time in entering class scores, it does take extra time in entering class lists on each diskette and in viewing the results of students who may be practicing a variety of skills at the same time.

SUMMARY STATEMENT

For the amount of content covered and the price, the Milliken Math Sequences should be highly considered. While there are some weaknesses, these are minor compared to the positive benefits which are provided, particularly in the sequencing and the range of the content. Teachers who are prepared to spend the time to learn the management system and to become familiar with the content sequence will find that the package will be effective.

STATUS

The package "MILLIKEN MATH SEQUENCES" has been designated as a RECOMMENDED learning resource.

PURCHASE INFORMATION

The commercial list price is $550 but schools may purchase it from the School Book Branch for $337.19 (Oct. 1983) (S.B.B. list price of $443.75 - 15%). Disks may be purchased individually for $54.15 (S.B.B. list price -15%).

Defective diskettes will be replaced without charge within a 30 day warranty period.

Disks which become inoperable through normal use may be replaced, within 13 months, for $12.16 each (S.B.B. list price - 15%).

Due to frequent disk access, disks in this package may be used with only one computer at a time.

GALAXY MATH FACTS

DESCRIPTION

Disk Title: Galaxy Math Facts
Producer: Random House
Address: 201 East 50th Street, New York, N.Y. 10022
Users : Grades 1-9
Contents: 7 disks, guide book, backups may be made
Topics: Whole numbers, place value, fractions, decimals, integers, estimation & rounding

Version: 1982
Cost: $147 U.S.
Tel. #: (212) 572-2616
Subject: Mathematics
Format: Apple II+, IIe

Other Formats Available (not evaluated): TRS 80 Models I and III

OBJECTIVES

To develop and enhance the students' automatic recall of learned basic math facts and to provide drill and practice through a highly motivational game setting in order to develop proficiency in mathematical skills.

CONTENT DESCRIPTION

This drill and practice program uses a space game approach. The user is captain of a space ship who wishes to return to Earth. In order to do so, (s)he must overcome a number of obstacles by answering questions within a specific time limit. The user selects his/her ranking and this determines the time limit.

Each of the seven disks addresses a specific topic. Within each disk, a number of operations may be practiced:

Math Facts - addition, subtraction, multiplication and division of whole numbers
Place Value - ones to one hundred thousands;
Fractions I - comparison, simplification, mixed numbers
Fractions II - addition, subtraction, multiplication and division of fractions
Decimals - comparison, addition, subtraction, multiplication and division of decimals
Integers - comparison, addition, subtraction, multiplication and division of integers
Rounding and Estimating - rounding to the nearest thousand and to the nearest thousandth
- estimating sums and differences to the nearest unit, ten or hundred.

CONTENT EVALUATION

The target audience for these programs varies from grades 1 to 9. The required level of reading is third grade and a minimal knowledge of the keyboard is also required.

The content covers the range and sequence of basic skills adequately. Depth and accuracy are also good. The size of the digits in the questions is kept small so that the emphasis is put on the operation. During a game, the student is motivated to answer a lot of questions. The provision for playing the game at different speed levels and the availability of specific content areas (including review units) are advantageous. These make the programs potentially useful for students of varying abilities and age levels.

There is a minor weakness in "Decimals" as the program does not write decimals with a zero if the value is less than 1. However, it does accept inputs such as 0.5.

Content sequence, range and depth are all well done.

INSTRUCTIONAL FORMAT DESCRIPTION

The student interacts with the program by selecting the unit to be practiced and the speed. Generally the user enters the answer but there are also some T/F questions.

Graphics, text and audio feedback are provided. The progress made is indicated by the units of energy left, distance from Earth and time taken. This is useful information to the user in developing game strategy. When the correct answer is given, "RIGHT" appears. When an incorrect response is given or if the time expires, "WRONG" appears on the screen along with the correct answer and a buzzing sound. Quantitative feedback consists of a congratulatory message at the end of the game which gives the user's name and rank.

Questions are posed randomly within the parameters of the unit. The three obstacles are also encountered in random order.

INSTRUCTIONAL FORMAT EVALUATION

The instructional technique is effective for the target audience. The outer space game approach is highly motivational for the students. The user is an active participant and the time required for each game is appropriate.

Negative feedback is somewhat weak as only the correct answer is shown. No explanation is provided and the answer is flashed too quickly.

Strategies are required to successfully cope with the encounters and this strengthens the game. However, there are only three obstacles to overcome and regular use of any or all of the disks will diminish the user's interest.

TECHNICAL DESIGN DESCRIPTION

The programs use a combination of color, sound and graphics. The sound has to be turned on through a coded input. Letters and numbers are normal size.

TECHNICAL DESIGN EVALUATION

The displays are appropriate to the target audience. Graphics and sound are used effectively. Color adds to the effectiveness but is not essential. A set of instructions is available on the disk but some initial assistance will be required from the teacher, particularly at the primary level (readability level is third grade). It doesn't take long to grasp the idea of the game, however, students may initially find the graphic displays distracting.

The written sections at the bottom of the screen are often missed. It would be better if attention was drawn to them in some way.

Students do not need much keyboard experience to play the game.

The opening credits are a little slow in evolving.

SUMMARY STATEMENT

The package was tested with students in grades 1-6 and was highly motivating for most. Although there may be a need for more challenges to be added to the three provided, the design was effective in keeping their interest and attention. The availability of a range of content and the varying difficulty levels provide educational capabilities that many games lack. While the lack of corrective feedback and tutorial sequences does limit the program's potential usefulness, the programs are successful in meeting the stated objective for the target audience. If used judiciously, these programs will provide motivational practice in a wide range of content for a wide range of students.

STATUS

GALAXY MATH FACTS has been designated as a SUPPLEMENTARY learning resource

PURCHASE INFORMATION

In Canada, this package may be purchased for $186 (Oct. 1983) from Britannica Learning Materials, Britannica Place, 175 Holiday Inn Drive, P.O. Box 2249, Cambridge, Ontario, N3C 3N4, (519) 658-4621.

Disks may be purchased individually for $45.00.

Defective diskettes will be replaced without charge within a 90 day warranty period. Note that a backup copy of each disk may be made.

Disks which become inoperable through normal use may be replaced for $15.00 upon return of the disk. There is no time limit for this warranty.

Teachers will appreciate the fact that the entire program is loaded during the initial boot which allows a single disk to be used in a number of computers.

MATHEMATICS: LEVEL A (Managed)
MATHEMATICS: LEVEL B (Managed)
MATHEMATICS: LEVEL C (Managed)

DESCRIPTION

Disk Title: Mathematics: Levels A, B and C (Managed versions)
Producer: Science Research Associates (Canada) Ltd.
Address: 707 Gordon Baker Road, Willowdale, Ontario, M2H 2S6
Users : Elementary and junior high students
Contents: 4 management disks, guide (59p) and program disks (A - 4, B - 8 and C - 11)
Topics: Fundamental operations with whole numbers, decimals and fractions

Version: 1981
Cost: $490, $645 & $705
Tel. #: (416) 497-7707
Subject: Mathematics
Format: Apple II+, IIe

Additional Hardware/Software Requirements: Take the IIe's 80 column board out when accessing print options
Other Formats Available (not evaluated): Atari 800

OBJECTIVES

To provide drill and practice in major arithmetic skills for grades 1-6

CONTENT DESCRIPTION

Topics in whole numbers (place value, counting, etc.), addition of whole numbers and subtraction of whole numbers are presented in Levels A, B and C. Multiplication of whole numbers, division of whole numbers and operations with fractions are included in Levels B and C. Operations with decimals are presented in Level C only. Level A is directed at the primary grades, Level B at middle elementary grades and Level C at upper elementary and junior high grades.

Each of the units is developmental and ranges from the introduction of a concept to the highest operation within that content area. Students progress through these levels based upon performance. A demonstration of mastery results in advancement while failure results either in a second attempt or in regression to easier levels.

Assistance is available to the user through a "help" mode which leads the student through the algorithm.

CONTENT EVALUATION

As a drill and practice package, the managed version is excellent. The scope and sequence are well planned. The flexibility and range of the difficulty levels are superb and the "help" mode provides the student with excellent assistance. Students are guided through the "help" sessions in very clear, well defined steps supported by good graphics. This is a most suitable program for students from grades 1 through 7.

INSTRUCTIONAL FORMAT DESCRIPTION

The student can input answers in parts (algorithmically) or in their entirety. The student also has the choice of requesting help during which (s)he is kept active in entering responses.

Feedback consists of happy faces or X's in boxes at the bottom of the screen. The boxes also indicate the number of questions in the drill. An "OK" and an optional audio "beep" also appear with correct responses, while a "NO" appears with errors. Quantitative results and a recommendation on future work appear at the end of each drill.

Evaluation in the "progress" mode is embedded. However, an option available to the teacher is the use of the "practice mode" as a test. A "placement mode" is available to determine which level a student should begin his/her work on each operation.

INSTRUCTIONAL FORMAT EVALUATION

The instructional design of this package is sound. Interaction with students is effective, the feedback is consistent, relevant and immediate. However, students are given only one chance at responding to a question. This can be a drawback especially since the entry of answers is not always right to left. The opportunity of using the practice mode as a test gives the teacher an excellent opportunity to quiz the student on any lesson. The options available to the student are excellent and, if used, can quickly improve skill levels. The flexibility in the control of the program, particularly of the scope and sequence, can give the teacher complete control of what the students will practice.

(Over)

TECHNICAL DESIGN DESCRIPTION

Text and numbers are generated in large size, high resolution graphics. An audio "beep" is optional.

TECHNICAL DESIGN EVALUATION

The package is well designed. Numbers and letters are large and easy to use and the program moves along at an adequate pace. Although the programs are generally friendly, reliable and consistent, some instruction to students is required regarding the special function of some keys.

MANAGEMENT SYSTEM DESCRIPTION

Options available to the teacher include:

1. Edit user records, e.g. add, delete or list users, lock/unlock lessons.
2. Edit curriculum options, e.g. add, delete units.
3. Edit teacher options, e.g. change passwords, audio feedback.
4. Print reports: five reports are available on the screen or in hard copy. These are: individual student reports, class list reports, graphic class reports (progress of the class within a unit), student positive report (% of lessons completed, comparison to class average), and unit enrollment reports (names of students in a unit).
5. Print seatwork: up to 99 exercises can be generated on the printer.

Options available to the student include:

1. Placement mode: a pre-test for a student entering a content area for the first time which will determine the beginning lesson.
2. Progress mode: practice with automatic progress. A score of 80% or more on a drill moves the student to the next drill. Scores of 50%-79% result in repetition of the drill. A failing mark (less than 50%) requires the drill to be repeated and a second failure results in regression to a previous lesson.
3. Practice mode: The work is recorded but the student's standing is not affected as in the progress mode.

A maximum of 150 students may be entered (50 per data diskette). Users are listed alphabetically on each diskette. Note that the print options do not work with the Apple IIe if the 80 column board is in place.

MANAGEMENT SYSTEM EVALUATION

The management package, although complex, is user friendly and would require about one hour to learn. It performs superbly and provides accurate and detailed records of student performances at all times.

The need to frequently exchange disks could be overcome if a dual drive version was available. The retrieval of student records is slow. Availability of a large number of computers does not improve the efficiency of this program to any extent.

SUMMARY STATEMENT

Apart from some problems in disk handling with the management system, the overall package is excellent. Disks will vary slightly in quality and some teachers may find the approach used to practice a particular skill is less than what they would have desired. However, the overall quality of the three levels is excellent, particularly in the scope and sequence of the content and the help available to the student who makes an error. The package is expensive but it should be measured against the number of objectives covered and the number of disks in the package.

STATUS

MATHEMATICS LEVELS A, B and C have been designated as RECOMMENDED learning resources.

PURCHASE INFORMATION

The commercial prices are indicated at the beginning of the report but schools may purchase the packages from the School Book Branch at the following prices (1983).

Level A $364.44 (S.B.B. list price $428.75 - 15%)
Level B $479.74 (S.B.B. list price $564.40 - 15%)
Level C $524.37 (S.B.B. list price $616.90 - 15%)

Disks may be purchased individually at the following prices (15% already deducted): Level A = $104.98; Level B = $99.45 Level C = $93.93

Defective diskettes will be replaced without charge within a 90 day warranty period.

Disks which become inoperable through normal use may be replaced for $7.74 (S.B.B. price - 15%). There is no time limit for this warranty.

As disk access is frequent, use of a disk is limited to one computer at a time.

EXPLORER METROS

DESCRIPTION

Disk Title: Explorer Metros
Producer: Sunburst Communications
Address: 39 Washington Avenue, Pleasantville, New York, 10570
Users : Grades 4-9
Contents: 1 disk, 1 backup, teacher's guide (27p)
Topics: Metric System (mass, capacity, length and temperature)
Other Formats Available (not evaluated): Available in Apple format only

Version: 1981
Cost: $31.85 U.S.
Tel. #: (914) 769-5030
Subject: Mathematics
Format: Apple II+, IIe

OBJECTIVES

To become accustomed to using units of metric measurement.
To reinforce the connection between a specific metric unit and its appropriate use.
To understand the relationship between different sizes of metric units.
To correctly estimate quantities using situations involving metric measurement.

CONTENT DESCRIPTION

The program is a space simulation/game designed to assess and challenge a student's ability to deal with metric estimation. Users explore a space colony and encounter situations requiring them to make choices based on an understanding of metric measurement.

The student is faced with 12 "encounters" to solve. These may involve metric mass, length, capacity or temperature. In each encounter, the user is asked to select an option describing the correct action to take in the situation described. Assistance is available to the user if (s)he wishes it. A metric conversion chart may be viewed or advice from the user's robot may be obtained. The chart relates metric dimensions to familiar objects (e.g. raisins, apples). The user is advised that the robot's advice is not always accurate (90% accuracy).

The user has 8 game "hours" to complete the exploration. Success in an encounter costs him/her half an hour whereas failure uses up an hour. Asking the robot for help costs the user 15 minutes. If the user completes 12 encounters within the time limit, (s)he is awarded the rank of "master metric explorer". Failure results in being "beamed" back aboard, presumably in disgrace.

CONTENT EVALUATION

Content range, sequence and depth are all satisfactory. The game provides an interesting way of reviewing or drilling metric system material. Prior instruction is necessary.

The content does not meet SI conventions with respect to symbols and spelling.

INSTRUCTIONAL FORMAT DESCRIPTION

Students interact with the program by entering a multiple choice option.

The program draws encounters randomly from a bank of 27 problems. Encounters are not repeated in any one sitting. The metric dimensions in each encounter are also randomized so that if a user does face the same challenge in another exploration, the metric value, and thus the correct option, will be different.

Positive feedback consists of a congratulatory statement and the deduction of half an hour. Negative feedback consists of a textual statement and the loss of an hour. There is no quantitatve feedback.

INSTRUCTIONAL FORMAT EVALUATION

The instructional design is generally good. The randomization of the questions and the randomization of the measurement quantities allow the program to be used a number of times without loss of motivation.

The negative feedback tends to be inadequate. The user is informed that (s)he made the wrong choice and at times the message will indicate what the correct answer should have been. However, often it is not clear enough why the choice was wrong. Also, the negative feedback tends to be "smart" and this may tempt students to err on purpose so that they can see what the program will say.

TECHNICAL DESIGN DESCRIPTION

Text is presented in high resolution graphics in upper and lower case letters. The encounter is also accompanied by a graphics picture which may or may not have color.

TECHNICAL DESIGN EVALUATION

Only 20 pictures are available and as a result they are not always appropriate to the encounter. As the graphics are not essential and do not add much, the program works equally well on a monochrome monitor.

There are frequent delays as the program accesses the disk for each encounter. This can be a little frustrating.

Other aspects of technical design are satisfactory.

MANAGEMENT SYSTEM DESCRIPTION

An editor function allows the teacher to: 1) enter an encounter, 2) change an encounter, 3) display an encounter, and 4) delete an encounter. Instructions for making these changes are available in the documentation.

The program has space for 36 encounters, 9 for each of the measurements of mass, capacity, length and temperature. Twenty graphical pictures are available.

MANAGEMENT SYSTEM EVALUATION

Detailed instructions are available to the teacher for changing or entering encounters. Teachers should not find these functions difficult to use. This feature of the program increases the usability of the disk considerably, not only in increasing the variety of encounters that are possible but also in increasing the range of the target audiences.

SUMMARY STATEMENT

The weaknesses of this program are the ineffective graphics, the absence of SI metric conventions and the finite number of challenges programmed on the disk. However, two of these weaknesses are surmountable through use of the editor.

The advantage of the game is the motivation it brings to metric review. The game is fun, it presents metric problems in an interesting fashion and it is relatively inexpensive. For teachers willing to use the editor, the value of the disk is expanded considerably.

STATUS

EXPLORER METROS has been designated as a SUPPLEMENTARY learning resource.

PURCHASE INFORMATION

The package (with backup included) may be purchased for $31.85 U.S. (Oct. 1983) from Sunburst Communications at the address given at the beginning of the report. In Canada, it is available for $41.00 (Oct. 1983) from International Tele-Film, 47 Donsley Ave. Toronto, Ontario, M6M 5A8, (416) 242-4483.

Replacements are free, for any reason, during the publication life of the product.

Additional disks may be purchased for $10.00 U.S. from the producer. (The Canadian distributor may not necessarily follow this policy.) Note that the package comes with a backup disk.

As the program accesses the disk continually, the disk may be used with only one computer at a time.

FRACTIONS/DECIMALS

DESCRIPTION

Disk Title: Fractions/Decimals
Producer: Sterling Swift Publishing Company
Address: 7901 South IH-35, Austin, Texas, 78744
Users : Upper Elementary and Junior High (indicated by the publisher)
Contents: 6 disks, teacher's guide (64p)
Topics: Operations with fractions and decimals
Additional Hardware/Software Requirements: Printer
Other Formats Available (not evaluated): Available in Apple format only

Version: 1981
Cost: $495 U.S.
Tel. #: (512) 282-6840
Subject: Mathematics
Format: Apple II+, IIe

OBJECTIVES

To provide drill and practice (with some tutorial instruction) in operations with fractions and decimals.

CONTENT DESCRIPTION

Operations with fractions are contained in 13 lessons on three diskettes. Lessons include basic fraction concepts, comparison and equivalence, conversions between mixed and improper fractions, addition, subtraction, multiplication and division.

Five decimal lessons are contained on one diskette. These include lessons on basic decimal concepts, comparing and rounding, adding, subtracting, multiplying and dividing.

Each lesson contains a brief tutorial which explains how to do the operation, then a set of problems, a choice of doing more questions and then a test.

Another program diskette contains four games. The content covers equivalent fractions, reducing fractions and converting mixed numbers/improper fractions. Each game consists of 10 questions which the user attempts to answer as quickly as possible. Selection of the content is done through a menu.

CONTENT EVALUATION

The majority of the content is on fractions which are not covered until the junior high grades in Alberta. As a result, elementary schools are not encouraged to purchase this package. All materials however are clearly stated and logically sequenced.

The depth of the drills is good as students may choose to receive more practice questions. In the tutorials, there are one or two examples per lesson, each of which is worked through step-by-step. This will likely be insufficient if the student has not been previously introduced to the concept. An option of receiving more examples or skipping the tutorial would have been advantageous.

The range and depth of the games are appropriate to the objectives of the program and the target audience. They are intended however only to provide speed drills on the content covered in Fractions Part 1.

INSTRUCTIONAL FORMAT DESCRIPTION

During the drill and test sections, the student is often instructed to work the questions out using paper and pencil. The final numerical answer is then entered. Interaction during the tutorial section is limited to pressing return. In the games, the user enters the numerical answer as quickly as possible.

The student receives immediate feedback after each response. Correct answers receive randomly selected positive reinforcements. The first incorrect response in a drill question results in a hint which is tutorial in nature and is usually directed at the first step needed to calculate the answer. If an error is made again, the student is shown how to do the question and is given the answer. Quantitative feedback is given after tests, at the end of each drill/game and at the end of each diskette.

A pre-test determines at which lesson the student should begin and a post-test determines if mastery has been met. The student is informed how many questions (s)he will be shown and what the mastery level is. It is possible to get a mark on the pre-test which allows the user to skip the disk completely or to select any lesson for review purposes. Students who have completed the lessons may also use the programs for review.

INSTRUCTIONAL FORMAT EVALUATION

In the drill sections, the input of only the final answer limits the amount of help that the user can be given. If an error is made, the program can not help the student with any of the intermediate steps. Interaction during the tutorial is also somewhat weak as the user is limited to pressing the return key.

Both positive and negative feedback are handled well. The method of giving hints and showing the student how to do it on the second error is a good feature. The quantitative feedback is also good. The user knows how well (s)he is doing at all times.

The use of pre-tests and post-tests is excellent. These are probably the finest features of the programs.

The instructional format of the games is adequate. However, they are not really games but are rather drills with graphical positive feedback. There is no strategy of winning involved other than to enter the answer quickly.

TECHNICAL DESIGN DESCRIPTION

The programs use high resolution graphics for most of the presentation. Sound is used to signal that the return key must be pressed. An animated figure and/or direction arrows focus the user's attention to appropriate parts of the display.

TECHNICAL DESIGN EVALUATION

The small figure used as a prompt, pointer and positive reinforcement is entertaining and functional without being distracting. The additional graphics used to focus attention may be a bit confusing since the screen can become crowded with arrows and explanations.

The sound may be distracting in the classroom. Also, the reset key will crash the program.

Otherwise, the technical quality is satisfactory.

MANAGEMENT SYSTEM DESCRIPTION

Teachers may enter, modify or delete class lists as well as update or display student records. Information available includes student names, numbers, passwords, prescriptions, individual records and small group reports. Apart from the individual records, all of the other reports are available only on a printer.

Results are stored on program diskettes which have to be updated onto the management diskette. Five classes with a maximum of 40 students each may be stored.

The teacher may use the management system to override the program's control of the student's sequence however this is not recommended by the publisher.

MANAGEMENT SYSTEM EVALUATION

The management of the records is adequate. While comprehensive records for all students may be kept, only a profile of achievement is displayed showing the number of times it takes a user to successfully complete a lesson. Student scores are not kept. Also, the teacher must remember to update this file regularly.

The sparse documentation on accessing the display data does not make it clear that only hard copy reports are available. Also, evaluators were unable to get group reports.

There may be some difficulties encountered when changes are made to the master diskette if one of the program diskettes is subsequently not accepted. It would be preferable to update the master disk only after additions or deletions have been made to the four program diskettes.

Students must be registered for all diskettes.

The system is somewhat confusing to learn. It has satisfactory features on the registration and manipulation of student lists but it provides only limited information on results.

SUMMARY STATEMENT

The availability of pre-tests and post-tests and the quality of the feedback are strong features. However the interaction is weak and the materials are expensive considering the limited number of grade levels in which they could be used in Alberta. The package is not advised for elementary schools.

STATUS

FRACTIONS/DECIMALS has been designated as a SUPPLEMENTARY learning resource for junior high schools .

PURCHASE INFORMATION

The package may be purchased for $495 U.S. (Oct. 1983) from Sterling Swift Publishing Company at the address given at the beginning of the report. Subsequent sets purchased by the same account are $295 U.S.

Defective diskettes will be replaced without charge within the warranty period of 90 days.

Damaged disks may be replaced for $9.95 U.S. with proof of purchase. There is no time limit for this warranty.

As the programs are controlled by a management system, disks in this package may be used with only one computer at a time.

WHOLE NUMBERS

DESCRIPTION

Disk Title: Whole Numbers
Producer: Sterling Swift Publishing Company
Address: 7901 South IH-35, Austin, Texas, 78744
Users : Elementary/Junior High (indicated by the publisher)
Contents: 6 disks, teacher's guide (72p)
Topics: Addition, subtraction, multiplication and division of whole numbers
Additional Hardware/Software Requirements: Printer, game paddles
Other Formats Available (not evaluated): Available in Apple format only

Version: 1981
Cost: $495 U.S.
Tel. #: (512) 282-6840
Subject: Mathematics
Format: Apple II+, IIe

OBJECTIVES

To provide drill and practice (with some tutorial instruction) in operations with whole numbers.

CONTENT DESCRIPTION

Addition, subtraction, multiplication and division programs are presented on four different disks. In each operation the user moves from the presentation of very basic number facts to questions which require regrouping concepts. Each strand is divided into five or six lessons with an introductory tutorial explaining how to do the type of question, then a set of problems, a choice of doing more questions and then a test.

Another program disk contains two games. In "Slam Dunk" the student attempts to answer as many questions within 30 seconds as possible. The user may choose mixed questions or questions on any one of the four operations. "Space War" is a competition between two students using game paddles with each attempting to be the first to enter three correct answers to more difficult addition or subtraction questions.

CONTENT EVALUATION

The content covers a limited portion of the elementary program in Alberta and is really only appropriate for grades 4 and 5. All materials however are clearly stated and logically sequenced.

The depth of the drills is good as students may choose to receive more practice questions. In the tutorials, there are one or two examples per lesson, each of which is worked through step-by-step. This will likely be insufficient if the student has not been previously introduced to the concept. An option of receiving more examples or skipping the tutorial would be advantageous.

The content of the games is appropriate to the objectives and to the target audience. The programs are intended only to provide speed drills on basic number facts and they do this adequately. However there is nothing in between the easy questions of "Slam Dunk" and the hard questions of "Space War".

INSTRUCTIONAL FORMAT DESCRIPTION

During the drill and test sections, the student inputs numerical answers and presses the return key. Regrouping, borrowing and cursor placement are all controlled automatically by the program and the user has no interaction in these stages. In more complex problems, the student may enter one digit at a time in response to specific instructions. Interaction during the tutorial section consists of pressing return.

The student receives immediate feedback after each response. Correct answers receive randomly selected positive reinforcements. The first incorrect response in a drill question results in a hint which is tutorial in nature and is usually directed at the first step needed to calculate the answer. If an error is made again, the student is shown how to do the question and is given the answer. An error in a game results in either provision of the correct answer (Slam Dunk) or repetition of part of the question (Space War). Quantitative feedback is given after tests, at the end of each drill/game and at the beginning and end of each diskette.

Pre-tests and post-tests have timed and untimed sections. The pre-test determines at which lesson the student should begin and the post-test determines if mastery has been met. The student is informed how many questions (s)he will be shown and what the mastery level is. It is possible to get a mark on the pre-test which allows the user to skip the disk completely or to select any lesson for review purposes. Students who have completed the lessons may also use the programs for review.

INSTRUCTIONAL FORMAT EVALUATION

The student interaction in the drills is generally satisfactory. It would have been better to require the user to regroup the numbers and to control the cursor in multiplication and division questions. Interaction during the tutorial is somewhat weak as the user is limited to pressing the return key.

Both positive and negative feedback are handled well. The method of giving hints and showing the student how to do it on the second error is a good feature. The quantitative feedback is also good. The user knows how well (s)he is doing at all times.

The use of pre-tests and post-tests is excellent. These are probably the finest features of the programs.

The instructional format of the games is adequate. "Slam Dunk" is not really a game. It is a drill with graphical feedback. There is no strategy of winning involved other than to enter the answer as quickly as possible. "Space War" has competition but the emphasis is solely on speed and not on any other kind of strategy.

TECHNICAL DESIGN DESCRIPTION

The programs use a high resolution graphics mode for most of the presentation. Sound is used to signal that the return key must be pressed. An animated figure and/or direction arrows focus the user's attention to appropriate parts of the display.

TECHNICAL DESIGN EVALUATION

The small figure used as a prompt, pointer and positive reinforcement is entertaining and functional without being distracting. The additional graphics used to focus attention may be a bit confusing since the screen can become crowded with arrows, explanations and very small digits.

The sound may be distracting in the classroom. Also, the reset key will crash the program.

Otherwise, the technical quality is satisfactory.

MANAGEMENT SYSTEM DESCRIPTION

Teachers may enter, modify or delete class lists as well as update or display student records. Information available includes student names, numbers, passwords, prescriptions, individual records and small group reports. Apart from the individual records, all of the other reports are available only on a printer.

Results are stored on program diskettes which have to be updated onto the management diskette. Five classes with a maximum of 40 students each may be stored.

The teacher may use the management system to override the program's control of the student's sequence however this is not recommended by the publisher.

MANAGEMENT SYSTEM EVALUATION

The management of the records is adequate. While comprehensive records for all students may be kept, only a profile of achievement is displayed showing the number of times it takes a user to successfully complete a lesson. Student scores are not kept. Also, the teacher must remember to update this file regularly.

The sparse documentation on accessing the display data does not make it clear that only hard copy reports are available.

There may be some difficulties encountered when changes are made to the master diskette if one of the program diskettes is subsequently not accepted. It would be preferable to update the master disk only after additions or deletions have been made to the four program diskettes.

Students must be registered for all diskettes.

The system is somewhat confusing to learn. It has satisfactory features on the registration and manipulation of student lists but it provides only limited information on results.

SUMMARY STATEMENT

The availability of pre-tests and post-tests and the quality of the feedback are strong features. However the materials are expensive considering the limited number of grade levels in which they could be used in Alberta.

STATUS

WHOLE NUMBERS has been designated as a SUPPLEMENTARY learning resource.

PURCHASE INFORMATION

The package may be purchased for $495 U.S. (Oct. 1983) from Sterling Swift Publishing Company at the address given at the beginning of the report. Subsequent sets purchased by the same account are $295 U.S.

Defective diskettes will be replaced without charge within a 90 day warranty period.

Damaged disks may be replaced for $9.95 U.S. with proof of purchase. There is no time limit for this warranty.

As the programs are controlled by a management system, disks in this package may be used with only one computer at a time.

MATH TITLES TO BE EVALUATED

PUBLISHER	TITLE
BORG WARNER EDUCATIONAL SYSTEMS	GEOMETRIC CONCEPTS A-B
BORG WARNER EDUCATIONAL SYSTEMS	GEOMETRIC CONCEPTS C-E
CONDUIT	ALGEBRA DRILL & PRACTICE
CONTROL DATA	BASIC NUMBER FACTS
CUISENAIRE	BUILDING ESTIMATION SKILLS
CUISENAIRE	GEOBOARD GEOMETRY & MEASUREMENT
CUISENAIRE	MATH IDEAS WITH BASE TEN BLOCKS
CYBNUS SOFTWARE	METRIC SYSTEM TUTOR
DAVIDSON	MATH BLASTER
DIDATECH SOFTWARE	FAY THAT MATH WOMAN
EDUCATIONAL DESIGN	TUTORIAL ARITHMETIC SYSTEMS
EDUSOFT	SPEED DRILL NUMBER LINE
ENCYCLOPAEDIA BRITANNICA	PROBLEM SOLVING IN ALGEBRA
H B SOFTWARE	KINDERGARDEN #2
HAYDEN BOOK	MICRO ADDITION
HAYDEN BOOK	MICRO DIVISION
HAYDEN BOOK	MICRO MULTIPLICATION
HAYDEN BOOK	MICRO SUBTRACTION
HOUGHTON MIFFLIN	MAC 4
HOUGHTON MIFFLIN	MAC 5
INDIAN HEAD SOFTWARE	DIVISION FACTS
INDIAN HEAD SOFTWARE	FRAC DEC PERCENT
INDIAN HEAD SOFTWARE	MULTIPLICATION FACTS
INDIAN HEAD SOFTWARE	REDUCING FRACTIONS
ISLAND SOFTWARE	JIGSAW

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PUBLISHER	TITLE
ISLAND SOFTWARE	JINX MELTER
ISLAND SOFTWARE	TRAFFIC JAM CHAIN REACTION
LEARNING (COMPANY)	BUMBLE GAMES
LEARNING (COMPANY)	BUMBLE PLOT
LEARNING (COMPANY)	MOPTOWN HOTEL
LEARNING (COMPANY)	MOPTOWN PARADE
LEARNING (COMPANY)	ROCKY'S BOOTS
LOCUS SYSTEMS	ARITHMETIC
LOVE	BASIC SKILLS IN ADDITION
LOVE	BASIC SKILLS IN DIVISION
LOVE	BASIC SKILLS IN MULTIPLICATION
LOVE	BASIC SKILLS IN SUBTRACTION
MECC	MATH VOL. 3
MELYNK	DIG
MICROCOMPUTER WORKSHOPS	123 DIGIT MULTIPLICATION
MICROCOMPUTER WORKSHOPS	ADDING DECIMALS
MICROCOMPUTER WORKSHOPS	ADDING FRACTIONS
MICROCOMPUTER WORKSHOPS	ADDITION WITH CARRY
MICROCOMPUTER WORKSHOPS	BINOMIAL MULTIPLICATION
MICROCOMPUTER WORKSHOPS	COORDINATES
MICROCOMPUTER WORKSHOPS	DIVIDING DECIMALS
MICROCOMPUTER WORKSHOPS	FACTORING ALGEBRAIC EXPRESSIONS
MICROCOMPUTER WORKSHOPS	GRAPHING LINEAR FUNCTIONS
MICROCOMPUTER WORKSHOPS	LONG DIVISION
MICROCOMPUTER WORKSHOPS	MULTIPLYING DECIMALS
MICROCOMPUTER WORKSHOPS	SIMULTANEOUS LINEAR EQUATIONS

PUBLISHER	TITLE
MICROCOMPUTER WORKSHOPS	SUBTRACTING DECIMALS
MICROCOMPUTER WORKSHOPS	SUBTRACTION
MILLIKEN	BATTLING BUGS CONCENTRATION
MILLIKEN	FRENZY FLIP FLOP
MILLIKEN	GOLF CLASSIC COMPUBAR
MILTON BRADLEY	PERCENTS
MILTON BRADLEY	RATIOS & PROPORTIONS
PMI	MASTER MATH
QUALITY EDUCATIONAL DESIGNS	ARITHMAGIC
QUALITY EDUCATIONAL DESIGNS	DECIMALS
RANDOM HOUSE	GRAND PRIX
READER'S DIGEST SERVICES	LEV. 5 & 6 PROBLEM SOLVING EDUDISKS
READER'S DIGEST SERVICES	LEV. 7 & 8 PROBLEM SOLVING EDUDISKS
SCHOOLHOUSE SOFTWARE	BLAST OFF
SCHOOLHOUSE SOFTWARE	BUG RACE 1A
SCHOOLHOUSE SOFTWARE	CANNON ATTACK
SCHOOLHOUSE SOFTWARE	CANNON ATTACK 5A
SCHOOLHOUSE SOFTWARE	CASTLE
SCHOOLHOUSE SOFTWARE	FRANK
SCHOOLHOUSE SOFTWARE	GENERAL MATH QUIZ
SCHOOLHOUSE SOFTWARE	LIGHTNING
SCHOOLHOUSE SOFTWARE	MY BUG
SCHOOLHOUSE SOFTWARE	PILOT
SCHOOLHOUSE SOFTWARE	SPEEDWAY
SCHOOLHOUSE SOFTWARE	SUPER TOE
SCHOOLHOUSE SOFTWARE	SUPER TOE 5D

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PUBLISHER	TITLE
SCHOOLHOUSE SOFTWARE	TARGET PRACTICE
SCHOOLHOUSE SOFTWARE	U BOAT
SRA	MATH LEVEL D PART 1
SRA	MATH LEVEL D PART 2
SRA	MATH LEVEL D PART 3
SRA	MATH LEVEL D PART 4
STONY BROOK	MOTION MATH LAB
SUNBURST COMMUNICATIONS	FACTORY EXPLORATIONS IN PROBLEM SOLVING
SUNBURST COMMUNICATIONS	MANAGING LIFESTYLES SURVIVAL MATH SKILLS
SUNBURST COMMUNICATIONS	ODD ONE OUT
SUNBURST COMMUNICATIONS	SOLVING EQUATIONS & INEQUALITIES
SVE	DEVELOPMENT OF BASIC MATH SKILLS 1
SVE	DEVELOPMENT+ OF BASIC MATH SKILLS 2
SVE	DEVELOPMENT++ OF BASIC MATH SKILLS 3
SVE	FRACTIONS DECIMALS & PERCENT
SVE	GUINNESS PROBLEM AREAS IN MATH
SVE	MATRICES
SVE	PREALGEBRA 1
SVE	PREALGEBRA 2
SVE	TESTING BASIC MATH SKILLS 1
SVE	TESTING+ BASIC MATH SKILLS 2
WINNER'S CIRCLE EDUCATIONAL	MATH INVADERS
XEROX EDUCATIONAL	STICKYBEAR BOP
XEROX EDUCATIONAL	TABLES & GRAPHS 8533
XEROX EDUCATIONAL	TABLES & GRAPHS 8542

MATH TITLES WE ARE UNABLE TO RECOMMEND

PUBLISHER	TITLE	CPYRT.	CODE
ADDISON WESLEY	COMPUTER MATH GAMES1	1982.0	41
ADDISON WESLEY	COMPUTER MATH GAMES2	1982.0	42
ADDISON WESLEY	COMPUTER MATH GAMES3	1982.0	41
ADDISON WESLEY	COMPUTER MATH GAMES4	1982.0	42
ADDISON WESLEY	COMPUTER MATH GAMES5	1982.0	41
ADDISON WESLEY	COMPUTER MATH GAMES6	1982.0	42
ADDISON WESLEY	COMPUTER MATH GAMES7	1982.0	42
APPLE COMPUTER	VOL. 1 GEOMETRY & MEASUREMENT	1980.0	41
APPLE COMPUTER	VOL. 2 GEOMETRY & MEASUREMENT	1980.0	41
AQUARIUS	ALGEBRA 1	0.0	50
AQUARIUS	ALGEBRA 2	0.0	50
AQUARIUS	ALGEBRA 3	0.0	50
AQUARIUS	BAR & PICTURE GRAPHS	1982.0	41
AQUARIUS	FRACTIONS PERCENTS & DECIMALS	1982.0	41
AQUARIUS	PIE & LINE GRAPHS	1982.0	41
AQUARIUS	REAL COST	1982.0	41
AQUARIUS	UNDERSTANDING CHECKBOOKS STATEMENTS	1982.0	41
AQUARIUS	VOL. 1 SOLVING WORD PROBLEMS	1981.0	41
AQUARIUS	VOL. 2 SOLVING WORD PROBLEMS	1981.0	41
AVANT GARDE CREATIONS	INTRO. ALGEBRA	1982.0	41
AVANT GARDE CREATIONS	QUADRATIC & THE PARABOLA	1981.0	41

NUMERICAL CODES: 40-43: EVALUATED UNFAVOURABLY

50: PRODUCT HAS BEEN DISCONTINUED BY THE PRODUCER

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MATH TITLES WE ARE UNABLE TO RECOMMEND - Continued

PUBLISHER	TITLE	CPYRT.	CODE
AVANT GARDE CREATIONS	REAL NUMBER SYSTEM	1981.0	41
AVANT GARDE CREATIONS	SPECIAL PRODUCTS & ALGEBRAIC FACTORS	1982.0	41
AVANT GARDE CREATIONS	STATISTICS	1981.0	41
BEHAVIORAL ENGINEERING	MATH STRATEGY	0.0	60
BERTAMAX	ESSENTIAL MATH	0.0	60
BERTAMAX	MATH FACTS GAMES 1	0.0	60
BERTAMAX	PROBLEM SOLVING 3	0.0	60
BERTAMAX	PROBLEM SOLVING 4	0.0	60
BERTAMAX	PROBLEM SOLVING 5	0.0	60
BERTAMAX	PROBLEM SOLVING 6	0.0	60
BLS	ADDITION	0.0	40
BLS	ALGEBRA SEMESTERS 1 & 2	1982.0	41
BLS	ARITHMETIC FUNDAMENTALS	1981.0	41
BLS	BASIC STATISTICS	0.0	50
BLS	COMPLEX OPERATIONS	1981.0	41
BLS	CONTEMPORARY MATH	0.0	40
BLS	DECIMALS A REVIEW COURSE	1980.0	41
BLS	DIVISION	0.0	40
BLS	ELEM. NUMBER CONCEPTS	0.0	40
BLS	FRACTIONS A REVIEW COURSE	1981.0	41
BLS	INTRO. TO ALGEBRA	0.0	50
BLS	INTRO. TO MEASUREMENT	0.0	40

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PUBLISHER	TITLE	CPYRT.	CODE
BLS	INTRO. TO THE METRIC SYSTEM	0.0	40
BLS	MULTIPLICATION	0.0	40
BLS	NATURAL NUMBERS & INTEGERS	1982.0	41
BLS	PERCENTAGE A REVIEW COURSE	1981.0	41
BLS	POLYNOMIALS	1982.0	41
BLS	QUADRATICS FACTORING RATIONAL EXPRESSIONS	1982.0	41
BLS	RATIO & PROPORTION	0.0	40
BLS	RATIONAL NUMBERS & REAL NUMBERS	1982.0	41
BLS	SCIENTIFIC MEASUREMENT SYSTEMS	0.0	50
BLS	SCIENTIFIC NOTATION & SIGNIFICANT FIGURES	0.0	50
BLS	SOLUTION OF FIRST DEGREE POLYNOMIAL EQUATIONS	1982.0	41
BLS	SUBTRACTION	0.0	40
BLS	TRIG	0.0	50
BLS	VARIABLES & SENTENCES	1982.0	41
BROWN	JUNIOR MATH	1981.0	41
COMPUTATIONS	EARLY ELEM. 1	0.0	42
COMPUTATIONS	EARLY ELEM. 2	0.0	42
COMPUTATIONS	SCHOOLHOUSE	0.0	42
COMPUTATIONS	SOCCER MATH	0.0	41
COMPUTER COURSEWARE SERVICES	ARITHMETIC DRILL	1982.0	41
COMPUTER COURSEWARE SERVICES	TELLING TIME	1982.0	41
COMPUTERRE	COUNTING PLUS	1982.0	41

NUMERICAL CODES: 40-43: EVALUATED UNFAVOURABLY 50: PRODUCT HAS BEEN DISCONTINUED BY THE PRODUCER

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PUBLISHER	TITLE	CPYRT.	CODE
CONDUIT	DISCOVERY LEARNING IN TRIG	1982.0	41
CONDUIT	INTERPRETING GRAPHS	0.0	60
CONDUIT	SURFACES	1982.0	70
CONDUIT	VOL. 2 ALGEBRA DRILL & PRACTICE	0.0	60
CONTROL DATA	DECIMALS	1982.0	43
CONTROL DATA	FRACTIONS	1982.0	41
CONTROL DATA	WHOLE NUMBERS	1982.0	43
DYNACOMP	TEACHER'S AIDE	0.0	60
EARL	LESSONS IN ALGEBRA	1981.0	43
EDUCATIONAL ACTIVITIES	ALGEBRAIC EXPRESSIONS	1982.0	41
EDUCATIONAL ACTIVITIES	GRAPHING	1981.0	41
EDUCATIONAL ACTIVITIES	GRAPHING EXPONENTIAL FUNCTIONS	0.0	60
EDUCATIONAL ACTIVITIES	INTRO. TO DECIMALS	1980.0	41
EDUCATIONAL ACTIVITIES	INTRO. TO MATH ON A COMPUTER	2.0	41
EDUCATIONAL ACTIVITIES	LONG DIVISION	1982.0	42
EDUCATIONAL ACTIVITIES	MATH FOR EVERYDAY LIVING	1982.0	41
EDUCATIONAL ACTIVITIES	MATH INVADERS	1982.0	41
EDUCATIONAL ACTIVITIES	MISSING MATH FACTS	1980.0	41
EDUCATIONAL ACTIVITIES	PERCENTAGES	1982.0	41
EDUCATIONAL ACTIVITIES	READ & SOLVE MATH PROBLEMS	1981.0	41
EDUCATIONAL ACTIVITIES	SOLVING EQUATIONS	1981.0	41
EDUCATIONAL ACTIVITIES	VOL. 1 BASIC MATH COMPETENCY SKILL DRILLS	1980.0	41

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PUBLISHER	TITLE	CPYRT.	CODE
EDUCATIONAL ACTIVITIES	VOL. 2 BASIC MATH COMPETENCY SKILL DRILLS	1980.0	41
EDUCATIONAL ACTIVITIES	VOL. 3 BASIC MATH COMPETENCY SKILL DRILLS	1980.0	41
EDUCATIONAL ACTIVITIES	VOL. 4 BASIC MATH COMPETENCY SKILL DRILLS	1980.0	41
EDUCATIONAL ACTIVITIES	VOL. 5 BASIC MATH COMPETENCY SKILL DRILLS	1980.0	41
EDUCATIONAL ACTIVITIES	VOL. 6 BASIC MATH COMPETENCY SKILL DRILLS	1980.0	41
EDUCATIONAL COURSEWARE	MATH DRILL	0.0	50
EDUCATIONAL MATERIALS & EQUIPMENT	METRIC SYSTEM TUTOR	1982.0	41
EDUCATIONAL MICRO SYSTEMS	FRACTIONS & MIXED NUMBER ARITHMETIC	1980.0	41
EDUCATIONAL MICRO SYSTEMS	WHOLE NUMBER ADDITION	1980.0	41
EDUCATIONAL MICRO SYSTEMS	WHOLE NUMBER DIVISION	1980.0	41
EDUCATIONAL MICRO SYSTEMS	WHOLE NUMBER MULTIPLICATION	1980.0	41
EDUCATIONAL MICRO SYSTEMS	WHOLE NUMBER SUBTRACTION	1980.0	41
EDUCATIONAL TEACHING AIDS	MICRO MATH	1982.0	41
EDUSOFT	FRACTION MIXED NUMBER RECOGNITION	1982.0	41
EDUSOFT	PLOT GUESS THE RULE	1982.0	42
EDUTECH	GRAPHS	1981.0	41
EDUTECH	TIME RATE DISTANCE	1981.0	41
EDUTEK	BASIC ARITHMETIC SKILLS	0.0	60
EDUTEK	COUNT TO 10	0.0	60
EDUTEK	COUNTING BY *	0.0	60
EDUTEK	COUNTING FUN	0.0	60
EDUTEK	COUNTING NUMBERS LESS THAN 101	0.0	60

NUMERICAL CODES: 40-43: EVALUATED UNFAVOURABLY 50: PRODUCT HAS BEEN DISCONTINUED BY THE PRODUCER

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PUBLISHER	TITLE	CPYRT.	CODE
EDUWARE SERVICES	ALGEBRA 1	1.3	42
EDUWARE SERVICES	ALGEBRA 2	1981.0	41
EDUWARE SERVICES	ALGEBRA 3	1982.0	41
EDUWARE SERVICES	ARITHMETIC SKILLS	1980.0	41
EDUWARE SERVICES	DECIMALS	3.0	41
EDUWARE SERVICES	FRACTIONS	1980.0	42
ELECTRONIC COURSEWARE SYSTEMS	ELEMENTS OF MATH	1982.0	41
ENABLE COMPUTER SOFTWARE	MATH DRILL	0.0	41
ENCYCLOPAEDIA BRITANNICA	MATH SKILLS ELEM. LEVEL	1983.0	41
ENCYCLOPAEDIA BRITANNICA	MATH SKILLS JUNIOR HIGH LEVEL	1983.0	41
FULLMER	DIVISION WITH ONE DIGIT DIVISORS	0.0	60
H B SOFTWARE	DOMINO GROUPING	1983.0	41
H B SOFTWARE	PRIMARY MATH 1	1983.0	41
H B SOFTWARE	PRIMARY MATH 2	1983.0	41
H B SOFTWARE	REGROUPING	1983.0	41
HARTLEY COURSEWARE	CALENDAR SKILLS	1981.0	41
HARTLEY COURSEWARE	CLOCK	1981.0	41
HARTLEY COURSEWARE	EXPANDED NOTATION	0.0	60
HARTLEY COURSEWARE	INTEGERS EQUATIONS	1981.0	41
HARTLEY COURSEWARE	MATH CONCEPTS	1981.0	42
HARTLEY COURSEWARE	METRIC DRILL	1981.0	41
HARTLEY COURSEWARE	MONEY MONEY	1982.0	41

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PUBLISHER	TITLE	CPYRT.	CODE
HARTLEY COURSEWARE	NUMBER WORDS LEV. 1	1981.0	43
HARTLEY COURSEWARE	NUMBER WORDS LEV. 2	1981.0	42
HARTLEY COURSEWARE	PRESCRIPTIVE MATH DRILL	1981.0	41
HARTLEY COURSEWARE	USING A CALENDAR	1982.0	42
IDEAL SCHOOL SUPPLY	MAGIC GRID	1980.0	41
IMCP	ALGEBRA 1 VOL. 1 D1	1982.0	41
IMCP	ALGEBRA 1 VOL. 1 D2	1982.0	41
IMCP	ALGEBRA 2 VOL. 3 D1	1982.0	41
IMCP	ALGEBRA 2 VOL. 3 D2	1982.0	41
IMCP	DISK 1 GEOMETRY 1 VOL. 2	1982.0	41
IMCP	DISK 2 GEOMETRY 1 VOL. 2	1982.0	41
INDIAN HEAD SOFTWARE	FRACTION DECIMAL PERCENT	1979.0	41
INDIAN HEAD SOFTWARE	MYSTERY FUNCTION	1980.0	41
INDIAN HEAD SOFTWARE	PERCENT PROBLEMS	1979.0	41
INDIAN HEAD SOFTWARE	PLACE VALUE	1979.0	41
INDIAN HEAD SOFTWARE	PRIME FACTOR	1979.0	41
INFORMATICS SOFTWARE	ARITHMETIC AIDS	3.1	42
INFORMATICS SOFTWARE	MOTION GEOMETRY	0.0	60
INFORMATICS SOFTWARE	TRANSFORMATION GEOMETRY	0.0	60
INTERPRETIVE EDUCATION	INCOME MEETS EXPENSES	1980.0	41
INTERPRETIVE EDUCATION	YOU CAN BANK ON IT	1981.0	41
ISLAND SOFTWARE	BLACK KAYLES	1982.0	42

NUMERICAL CODES: 40-43: EVALUATED UNFAVOURABLY 50: PRODUCT HAS BEEN DISCONTINUED BY THE PRODUCER

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(Over)

MATH TITLES WE ARE UNABLE TO RECOMMEND - Continued

PUBLISHER	TITLE	CPYRT.	CODE
ISLAND SOFTWARE	RUBIK CANDLES	1982.0	42
MANITOBA COMPUTER ASSISTED LEARN	DISK A1	1982.0	41
MANITOBA COMPUTER ASSISTED LEARN	DISK A2	1982.0	41
MANITOBA COMPUTER ASSISTED LEARN	DISK A3	1982.0	41
MANITOBA COMPUTER ASSISTED LEARN	DISK A4	1982.0	41
MANITOBA COMPUTER ASSISTED LEARN	DISK A5	1982.0	41
MATH SOFTWARE	JUNIOR HIGH PACKAGE	1981.0	42
MATHWARE (MATHCITY)	BASIC MATH SYSTEMS	1981.0	41
MCGRAW HILL RYERSON	MATH REGROUPING GAMES	1982.0	41
MCGRAW HILL RYERSON	MATH WORD GAMES	1982.0	41
MECC	AESTHEOMETRY VOL. 1	3.3	41
MECC	ELEM. VOL. 10	1.0	41
MECC	ELEM. VOL. 8	1.0	41
MECC	ELEM. VOL. 9	1.0	41
MECC	MATH VOL. 1	1.0	41
MECC	MATH VOL. 2	1.0	41
MECC	MATH VOL. 4	1.1	70
MEDIA MATERIALS	BANKING & CONSUMER TRANSACTIONS	1983.0	41
MEDIA MATERIALS	CAR OWNER'S MANUAL FOR BETTER MATH SKILLS	1983.0	41
MEDIA MATERIALS	ESSENTIAL MATH SKILLS FOR COMPUTING TAXES	1983.0	41
MEDIA MATERIALS	MATH & YOUR PERSONAL FINANCES	1983.0	41
MEDIA MATERIALS	MATH AROUND THE HOUSE	1983.0	41

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PUBLISHER	TITLE	CPYRT.	CODE
MEDIA MATERIALS	MATH IN YOUR INSURANCE POLICIES	1983.0	41
MEDIA MATERIALS	ON THE ROAD WITH BASIC MATH SKILLS	1983.0	41
MICRO LEARINGWARE	TEDDY BEARS COUNTING FUN	0.0	60
MICRO LEARNINGWARE	EDUCATIONAL PACKAGE 3	0.0	60
MICRO LEARNINGWARE	ELEM. MATH PACKAGE 1	0.0	60
MICRO LEARNINGWARE	ELEM. MATH PACKAGE 2	0.0	60
MICRO LEARNINGWARE	ELEM. MATH PACKAGE 5	0.0	60
MICRO POWER LIGHT	DIPT	1980.0	41
MICRO POWER LIGHT	FACTORING	1981.0	41
MICRO POWER LIGHT	GOING TOGETHER	1.2	41
MICRO POWER LIGHT	NORMAL DEVIATION	0.0	40
MICRO POWER LIGHT	OFF CENTER	1980.0	41
MICRO POWER LIGHT	OFF LINE	1.2	41
MICRO POWER LIGHT	ON THE AVERAGE	1980.0	41
MICRO POWER LIGHT	PROOFS & PROPERTIES	1980.0	41
MICRO POWER LIGHT	PYTHAGOREAN PROOFS	1980.0	41
MICRO POWER LIGHT	RIEMANN INTEGRAL	1980.0	41
MICRO POWER LIGHT	WHAT'S THE SCORE	1.2	41
MICROCOMPUTER WORKSHOPS	ORDER OF OPERATIONS	1982.0	42
MICROCOMPUTERS IN EDUCATION	BASEBALL	1981.0	41
MICROCOMPUTERS IN EDUCATION	GOLF	1981.0	41
MICROCOMPUTERS IN EDUCATION	MATH DRILL	1981.0	41

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(Over)

PUBLISHER	TITLE	CPYRT.	CODE
MICROCOMPUTERS IN EDUCATION	STARS	1981.0	41
MICROCOMPUTERS IN EDUCATION	ZAP MULT.	1981.0	41
MICROMATICS	INITIAL TEACHING SET	0.0	50
MICROMATICS	SELF CONTAINED INSTRUCTIONAL SET	0.0	50
MICROMATICS	STRUCTURE PACK	0.0	50
MICROPHYS PROGRAMS	CALCULUS 1 DISKETTE	0.0	60
MICROPHYS PROGRAMS	JUNIOR HIGH MATH DISKETTE	0.0	60
MICROPHYS PROGRAMS	SENIOR HIGH MATH 1 DISKETTE	0.0	60
MICROPHYS PROGRAMS	SENIOR HIGH MATH 2 DISKETTE	0.0	60
MILLIKEN	ALIENCOUNTER FACE FLASH	1982.0	41
MILLIKEN	GULP ARROW GRAPHICS	1982.0	41
MILLIKEN	JAR GAME CHAOS	1982.0	41
MILTON BRADLEY	DECIMAL SKILLS	1982.0	41
MILTON BRADLEY	DIVISION SKILLS	1982.0	42
MILTON BRADLEY	MIXED NUMBERS	1982.0	41
NTS	GATHERING SPEED SET1	1981.0	41
NTS	GATHERING SPEED SET2	1981.0	41
NTS	GETTING THE BASICS 1	1980.0	41
NTS	GETTING THE BASICS 2	1980.0	41
NTS	MATH LAB 1 TAKING INVENTORY	1981.0	41
NTS	MOVING ON SET 1	1982.0	41
NTS	MOVING ON SET 2	1980.0	41

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PUBLISHER	TITLE	CPYRT.	CODE
NTS	MOVING ON SET 3	0.0	50
NTS	STARTING OUT SET 1	1980.0	41
NTS	STARTING OUT SET 2	1980.0	41
ORANGE CHERRY MEDIA	ADDITION & SUBTRACTION	0.0	50
ORANGE CHERRY MEDIA	BEGINNING MATH CONCEPTS	0.0	50
ORANGE CHERRY MEDIA	DIVISION OF WHOLE NUMBERS	0.0	50
ORANGE CHERRY MEDIA	INTERMEDIATE MATH SKILLS	0.0	50
ORANGE CHERRY MEDIA	MULTIPLICATION OF WHOLE NUMBERS	0.0	50
ORANGE CHERRY MEDIA	TELLING TIME COMPUTER SET	0.0	40
ORANGE CHERRY MEDIA	USING MONEY & MAKING CHANGE	0.0	40
PROGRAM DESIGN	ADDITION WITH CARRYING	0.0	60
PROGRAM DESIGN	CASH REGISTER	0.0	60
PROGRAM DESIGN	NUMBER SERIES	0.0	60
PROGRAM DESIGN	QUANTITATIVE COMPARISONS	0.0	60
QUALITY EDUCATIONAL DESIGNS	FACTORING WHOLE NUMBERS	1982.0	42
QUALITY EDUCATIONAL DESIGNS	FRACTIONS	1979.0	42
RANDOM HOUSE	BASIC MATH FACTS & GAMES	1981.0	41
RANDOM HOUSE	BASIC MATH FACTS DRILL	1981.0	41
RANDOM HOUSE	BASIC MATH FLASH FACTS	1981.0	41
READER'S DIGEST SERVICES	LEV. 1 MATH ASSESSMENT PRESCRIPTIVE EDUDISKS	1981.0	41
READER'S DIGEST SERVICES	LEV. 2 MATH ASSESSMENT PRESCRIPTIVE EDUDISKS	1981.0	41
READER'S DIGEST SERVICES	LEV. 3 MATH ASSESSMENT PRESCRIPTIVE EDUDISKS	1981.0	41

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(Over)

PUBLISHER	TITLE	CPYRT.	CODE
READER'S DIGEST SERVICES	LEV. 4 MATH ASSESSMENT PRESCRIPTIVE EDUDISKS	1981.0	41
READER'S DIGEST SERVICES	LEV. 5 MATH ASSESSMENT PRESCRIPTIVE EDUDISKS	1981.0	41
READER'S DIGEST SERVICES	LEV. 6 MATH ASSESSMENT PRESCRIPTIVE EDUDISKS	1981.0	41
READER'S DIGEST SERVICES	LEV. 7 MATH ASSESSMENT PRESCRIPTIVE EDUDISKS	1981.0	41
RESTON	MULTIPLOY	1982.0	41
RIGHT ON PROGRAMS	ADDITION & SUBTRACTION	1981.0	41
RIGHT ON PROGRAMS	FRACTIONS	1981.0	41
RIGHT ON PROGRAMS	MATCHING & USING NUMBERS	1981.0	41
RIGHT ON PROGRAMS	MATCHING GEOMETRIC FIGURES	1981.0	41
RIGHT ON PROGRAMS	MATH MEASUREMENTS	1981.0	41
RIGHT ON PROGRAMS	MONEY	1981.0	41
RIGHT ON PROGRAMS	MULTIPLICATION & DIVISION	1981.0	41
RIGHT ON PROGRAMS	PROBLEM SOLVING	1981.0	41
RIGHT ON PROGRAMS	SETS	1981.0	41
RIGHT ON PROGRAMS	SIMPLE MULTIPLICATION & DIVISION	1981.0	41
RIGHT ON PROGRAMS	TELLING TIME	1981.0	41
SCANDURA TRAINING SYSTEMS	MICROTUTOR 2 ARITHMETIC SYSTEMS	0.0	60
SCHOOL COURSEWARE JOURNAL	COINS	1982.0	41
SCHOOL COURSEWARE JOURNAL	CONCENTRATION	1982.0	41
SCHOOL COURSEWARE JOURNAL	DECIMAL ESTIMATION	1981.0	42
SCHOOL COURSEWARE JOURNAL	DIVISION DRILL	1981.0	41
SCHOOL COURSEWARE JOURNAL	SAMPLING	1981.0	41

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PUBLISHER	TITLE	CPYRT.	CODE
SCHOOL COURSEWARE JOURNAL	SIGN DRILL	1982.0	43
SCOTT FORSEMAN	DIVISION 1	0.0	60
SCOTT FORSEMAN	MULTIPLICATION 1	0.0	60
SCOTT FORSEMAN	NUMERATION 1	0.0	60
SCOTT FORSEMAN	NUMERATION 2	0.0	60
SCOTT FORSEMAN	VOL. 1 ADDITION & SUBTRACTION	0.0	60
SCOTT FORSEMAN	VOL. 2 ADDITION & SUBTRACTION	0.0	60
SHERIDAN COLLEGE	MICROMATH	1982.0	41
SOUTHWEST EDPSYCH SERVICES	MATH MACHINE	1.2	42
SOUTHWEST EDPSYCH SERVICES	MATH WARS	1982.0	41
SRA	ARITHMETIC GAMES	1980.0	41
SRA	FACT TRACK	1981.0	41
SUNBURST COMMUNICATIONS	CHALLENGE MATH	1982.0	41
SUNBURST COMMUNICATIONS	POLYNOMIAL PRACTICE USING TILES	1983.0	41
SUNBURST COMMUNICATIONS	SURVIVAL MATH	1982.0	41
SUNBURST COMMUNICATIONS	TEASERS BY TOBBS	1982.0	42
SUNBURST COMMUNICATIONS	TOBBS LEARNS ALGEBRA	1983.0	41
SVE	CIRCLES	1982.0	41
SWIFT	ARITH. CLASSROOM ADDITION	1982.0	41
SWIFT	ARITH. CLASSROOM DIVISION	1982.0	41
SWIFT	ARITH. CLASSROOM MULTIPLICATION	1982.0	41
SWIFT	ARITH. CLASSROOM SUBTRACTION	1982.0	41

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MATH TITLES WE ARE UNABLE TO RECOMMEND - continued

PUBLISHER	TITLE	CPYRT.	CODE
SWIFT	FUNDAMENTALS OF MATH	0.0	60
TECK	DRILL 2	0.0	60
TELEPHONE SOFTWARE CONNECTION	MATH TUTOR	0.0	60
TELEPHONE SOFTWARE CONNECTION	TIME TUTOR	0.0	60
WADSWORTH ELECTRONIC	EQUATIONS & INEQUALITIES	1983.0	41
WADSWORTH ELECTRONIC	EXPONENTIAL & LOGARITHMIC FUNCTIONS	1983.0	41
WADSWORTH ELECTRONIC	FUNCTIONS	1983.0	41
WADSWORTH ELECTRONIC	FUNDAMENTAL CONCEPTS OF ALGEBRA	1983.0	41
WADSWORTH ELECTRONIC	POLYNOMIAL & RATIONAL FUNCTIONS CONIC SECTIONS	1983.0	41
WADSWORTH ELECTRONIC	SYSTEMS OF EQUATIONS & INEQUALITIES	1983.0	41
WISE OWL WORKSHOP	FLASH CARDS	1981.0	41

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SCIENCE INDEX

RESULTS

PUBLISHER	TITLE	GRADES	STATUS	PAGE
Conduit	Compete	10 - 12	Supplementary	Sc 3

LIST OF TITLES TO BE EVALUATED Sc 5

LIST OF TITLES WE ARE UNABLE TO RECOMMEND Sc 13

COMPETE

DESCRIPTION

Disk Title: Compete
Producer: Conduit
Address: P.O. Box 380, Iowa City, Iowa, 52242
Users : High school/college students
Contents: 1 disk, Teacher's Guide (11p), Student's notes (13p)
Topics: Interactions between flowering plants
Other Formats Available (not evaluated): TRS-80 Model I/III, PET

Version: 1979
Cost: $38.95
Tel. #: (319) 353-5789
Subject: Biology
Format: Apple II+, IIe

OBJECTIVES

The learner will investigate the effects of overcrowding, interaction of plants in a monoculture, interaction of plants in a plant mixture, and time versus amount of plant growth and will formulate conclusions from the computer simulated conditions. (Inferred)

CONTENT DESCRIPTION

This program is a simulation of plant growth and yields under two possible conditions - monoculture or mixture. The plants studied are barley, oats, dwarf peas and tall peas. The row spacing may be modified to discover relationships between plant growth vs. row spacing, comparative plant growth in two competing species with the same row spacing, and comparative plant growth in two competing species with different row spacing. All data are displayed in metric form (e.g. grams/square meter).

CONTENT EVALUATION

The computer program itself is simply a data generator and is intended to complement lab experiments. It quickly generates clear and easily interpreted data for student manipulation. The teacher's and student's guides are very usable and well organized.

The content, however, is not completely appropriate for high school students. The accompanying student's guide is written at a reading level which would tax the average high school student. Also, the only place in the existing Alberta curriculum where this might be usable is in an ecology unit or possibly in an agriculture course with advanced students.

While data are displayed in metric form, this is not always SI metric.

INSTRUCTIONAL FORMAT DESCRIPTION

Student interaction consists of making decisions as to which plant type is to be grown and what the row spacing should be. The only feedback (other than the information being provided) is for an incorrect response to be corrected (e.g. if the student types in 'Y' instead of the required YES).

INSTRUCTIONAL FORMAT EVALUATION

This simulation provides easily interpreted data. However, for the average student to make constructive use of this program, the teacher would be required to set up the conditions to be studied (e.g. compare plant A and B at the same row spacing and then do...). The student guide directs the student in this way, but it would be above the level of the average high school student to follow the instructions independently.

Once the data are graphed and the student proceeds, there is no way of recalling the information. The program does not ask interpretation or comprehension questions. Thought provoking questions are addressed in the support materials but their high reading level does not make them appropriate for average students.

Student predictions are not entered into the computer or recorded on the disk but rather are entered into the workbook. Evaluation of the student's responses therefore is possible only if the teacher marks the workbook.

(Over)

TECHNICAL DESIGN DESCRIPTION

Color high-resolution graphs are used in the plotting of information. Text, although generated in high-res graphics, is not larger than normal lettering. Sound is not used.

TECHNICAL DESIGN EVALUATION

The use of high resolution graphics for plotting data is appropriate and the use of shape tables allows for clear labelling of the lines of the graph (e.g. barley) as well as the axes.

The technical design could be improved if there were provision for reviewing a graph or if results were available in print copy to enable further study of the graph.

SUMMARY STATEMENT

This disk is a data generator only. Together with the support materials and with teacher intervention, it does provide enough latitude to allow for diverse teaching approaches to accommodate various levels of students. Its strength could be improved by including more of the information in the support materials on the disk itself or by making printouts of the graphs available.

STATUS

COMPETE has been designated as a SUPPLEMENTARY learning resource.

PURCHASE INFORMATION

This package may be purchased for $38.95 (Oct. 1983) from Bell and Howell, 230 Barnac Drive, Weston, Ontario, M9L 2X5, (416) 746-2200.

Defective diskettes will be replaced without charge within a 90 day warranty period.

There is no warranty for disks which become inoperable through normal use.

Teachers will appreciate the fact that the entire program is loaded during the initial boot which allows a single disk to be used in a number of computers.

SCIENCE TITLES TO BE EVALUATED

PUBLISHER	TITLE
ALTERNA TECHNICAL	WHAT IS SCIENCE
AQUARIUS	CHEMISTRY SIM. SET 1
AQUARIUS	CHEMISTRY SIM. SET 2
AVANT GARDE CREATIONS	ALIVENESS LIFE DYNAMIC
AVANT GARDE CREATIONS	CONDITIONING LIFE DYNAMIC
AVANT GARDE CREATIONS	CREATIVITY LIFE DYNAMIC PACKAGE
AVANT GARDE CREATIONS	ENVIRONMENT LIFE DYNAMIC
AVANT GARDE CREATIONS	LIFE DYNAMIC TRANSFORMATION
AVANT GARDE CREATIONS	MEANING LIFE DYNAMIC
AVANT GARDE CREATIONS	NORMALCY LIFE DYNAMIC
AVANT GARDE CREATIONS	PHYSICAL LIFE DYNAMIC
AVANT GARDE CREATIONS	RELATIONSHIP LIFE DYNAMIC
AVANT GARDE CREATIONS	RESPONSIBILITY LIFE DYNAMIC
AVANT GARDE CREATIONS	SEXUALITY LIFE DYNAMIC
BRAIN BANK	HUMAN BODY AN OVERVIEW
BRAIN BANK	SKELETAL SYSTEM
COLLIER MACMILLAN	MICROCHEM
COMPRESS	ATOMIC WEIGHTS
COMPRESS	BIOBITS 3 GROWTH
COMPRESS	BIOBITS 4 INTERACTIONS
COMPRESS	BIOBITS 5 PROFILES IN POPULATION
COMPRESS	BIOBITS 6 EVOLUTION
COMPRESS	BIOBITS 7 NUCLEIC ACID CONNECTION
COMPRESS	CHEMAZE
COMPRESS	CHEMICAL ELEMENTS

(Over)

PUBLISHER	TITLE
COMPRESS	CHEMICAL FORMULAS & EQUATIONS(BALANCING EQUATIONS)
COMPRESS	IDEAL GASES
COMPRESS	INORGANIC NOMENCLATURE
COMPRESS	INTRO. TO POLYMERS
COMPRESS	KINETICS OF GROWTH OF STEP GROWTH POLYMERIZATION
COMPRESS	MENDELIAN GENETICS
COMPRESS	MOLECULAR WEIGHT OF POLYMERS
COMPRESS	NOMENCLATURE OF POLYMERS
COMPRESS	PERCENT COMPOSITION
COMPRESS	POPULATION GROWTH
COMPRESS	QUALITATIVE ORGANIC ANALYSIS
COMPRESS	QUIZ ON POLYMER CHEMISTRY
COMPRESS	RADICAL INITIATION OF CHAIN GROWTH
COMPRESS	STRUCTURE OF POLYMERS
CONDOR COMPUTING	BALANCING MOLECULES
CONDOR COMPUTING	DENSITY LAB
CONDOR COMPUTING	ELEMENTS & SYMBOLS
CONDUIT	CHEM LAB SIM. 1
CONDUIT	CHEM LAB SIM. 2
CONDUIT	HABER
CONDUIT	IDGAME
CONDUIT	INTERP
CONDUIT	RKINET
CROSS EDUCATIONAL SOFTWARE	ATOMIC PHYSICS
CROSS EDUCATIONAL SOFTWARE	CIRCULAR MOTION
CROSS EDUCATIONAL SOFTWARE	CONSERVATION LAWS

SCIENCE TITLES TO BE EVALUATED - continued

PUBLISHER	TITLE
CROSS EDUCATIONAL SOFTWARE	ELECTRICITY & MAGNETISM
CROSS EDUCATIONAL SOFTWARE	PHYSICS GEMS
CROSS EDUCATIONAL SOFTWARE	STATICS
CROSS EDUCATIONAL SOFTWARE	STELLAR ASTRONOMY
CROSS EDUCATIONAL SOFTWARE	THERMODYNAMICS
CROSS EDUCATIONAL SOFTWARE	VECTORS & GRAPHING
CROSS EDUCATONAL SOFTWARE	OPTICS
CYGNUS SOFTWARE	CHARACTERISTICS OF A SCIENTIST
DATATECH SOFTWARE SYSTEMS	LAB BALANCE TUTOR
DATATECH SOFTWARE SYSTEMS	VOLUME TUTOR
DIGIPAC COMPUTER CONSULTING	GRAPHICAL ANALYSIS
DIGIPAC COMPUTER CONSULTING	MOLE CALCULATIONS
DIGIPAC COMPUTER CONSULTING	MOLECULAR MOTIONS
DIGIPAC COMPUTER CONSULTING	TITRATOR
DISCOVER SOFTWARE INTERNATIONAL	PROJECT SATELLITE
EARTHWARE COMPUTER SERVICES	STAR SEARCH
EARTHWARE COMPUTER SERVICES	VOLCANOES
EDUCATIONAL COURSEWARE	ASTRONOMY 1
EDUCATIONAL COURSEWARE	ASTRONOMY 2
EDUCATIONAL COURSEWARE	FREE FALL
EDUCATIONAL COURSEWARE	LAB PLOTS
EDUCATIONAL COURSEWARE	LINEAR MOMENTUM
EDUCATIONAL COURSEWARE	PLANETS
EDUCATIONAL COURSEWARE	WAVE & OPTICS
EDUCATIONAL IMAGES	VIBRATIONS OF BENT TRIATOMIC MOLECULES
EDUCATIONAL MATERIALS & EQUIPMENT	AIR POLLUTION

(Over)

PUBLISHER	TITLE
EDUCATIONAL MATERIALS & EQUIPMENT	COLLISIONS HARMONIC MOTION
EDUCATIONAL MATERIALS & EQUIPMENT	COMPLEX CIRCUITS
EDUCATIONAL MATERIALS & EQUIPMENT	CONSERVATION OF ENERGY & MOMENTUM
EDUCATIONAL MATERIALS & EQUIPMENT	ELECTRICITY
EDUCATIONAL MATERIALS & EQUIPMENT	GENETICS & EVOLUTION
EDUCATIONAL MATERIALS & EQUIPMENT	HOME ENERGY CONSERVATI
EDUCATIONAL MATERIALS & EQUIPMENT	INTRO. GENETICS
EDUCATIONAL MATERIALS & EQUIPMENT	LAWS OF MOTION
EDUCATIONAL MATERIALS & EQUIPMENT	LIGHT WAVES
EDUCATIONAL MATERIALS & EQUIPMENT	MICROBIOLOGY TECHNIQUES
EDUCATIONAL MATERIALS & EQUIPMENT	MIRRORS & LENSES
EDUCATIONAL MATERIALS & EQUIPMENT	ORGANIC CHEMISTRY SERIES
EDUCATIONAL MATERIALS & EQUIPMENT	PROJECTILE & CIRCULAR MOTION
EDUCATIONAL MATERIALS & EQUIPMENT	SOLAR OPTION
EDUCATIONAL MATERIALS & EQUIPMENT	STATICS & DYNAMICS
EDUSOFT	FLIGHT VECTOR
EDUTECH	ASTROLAB
EDUTECH	BIRDBREED
EDUTECH	COMPTROL LAB
EDUTECH	FOURIER ANALYSIS
EDUTECH	PHYSICS COMPULAB
EDUTECH	PHYSICS DEMOS
EDUTECH	PHYSICS INTERACT
EDUWARE SERVICES	RENDEZVOUS
ENCYCLOPAEDIA BRITANNICA	ACIDS & BASES
ENCYLOPAEDIA BRITANNICA	STOICHIOMETRY

PUBLISHER	TITLE
ENTELEK	COMPUTER BASED PHYSICS LAB
ENTELEK	GENETICS WITH COMPUTER
ENTELEK	PHYSICS WITH COMPUTER
IDEAL SCHOOL SUPPLY	STRUCTURE OF LEAVES
IDEATECH	BASIC ELECTRICITY
INDIAN HEAD SOFTWARE	CHEMICAL SYMBOLS
INDIAN HEAD SOFTWARE	VECTOR SUM
INFORMATION UNLIMITED	TELLSTAR LEV. 1
INFORMATION UNLIMITED	TELLSTAR LEV. 2
KRELL SOFTWARE	F G NEWTON
KRELL SOFTWARE	ISSAC NEWTON
MCGRAW HILL RYERSON	ENERGY SEARCH
MECC	ELEM. VOL. 4
MECC	SCIENCE VOL. 1
MECC	SCIENCE VOL. 2
MECC	SCIENCE VOL. 3
MECC	SCIENCE VOL. 4
MERLAN SCIENTIFIC	BASIC MATH TECHNIQUES
MERLAN SCIENTIFIC	CELLULAR REPRODUCTION
MERLAN SCIENTIFIC	CHEMICAL NOMENCLATURE
MERLAN SCIENTIFIC	DISK A WAVES & VIBRATIONS
MERLAN SCIENTIFIC	DISK B WAVES & VIBRATIONS
MERLAN SCIENTIFIC	EXPONENTIAL NOTATION
MERLAN SCIENTIFIC	MEASUREMENT
MERLAN SCIENTIFIC	MENDELIAN GENETICS
MERLAN SCIENTIFIC	METRIC GRAPHS

(Over)

PUBLISHER	TITLE
MICRO POWER LIGHT	SCIENTIFIC MEASUREMENTS
MICROCOMPUTER WORKSHOPS	GENETICS
MICROCOMPUTER WORKSHOPS	WRITING CHEMICAL FORMULAS
MICROPI	NOTAT
MICROPI	QUAL
ORANGE CHERRY MEDIA	WEATHER SCIENCE SET
PHILADELPHIA SCHOOL DISTRICT	ATOM
PHILADELPHIA SCHOOL DISTRICT	CELLM
PHILADELPHIA SCHOOL DISTRICT	CLOUDS
PHILADELPHIA SCHOOL DISTRICT	ELMENT
PHILADELPHIA SCHOOL DISTRICT	EVOLV
PHILADELPHIA SCHOOL DISTRICT	MOLAR
PHILADELPHIA SCHOOL DISTRICT	PERIOD
PHILADELPHIA SCHOOL DISTRICT	SLITS
PHILADELPHIA SCHOOL DISTRICT	SMELL
PHILADELPHIA SCHOOL DISTRICT	SPACE
PROGRAMMA INTERNATIONAL	SIRIUS
PROGRAMS FOR LEARNING	ACID BASE CHEMISTRY
PROGRAMS FOR LEARNING	BASIC ELECTRICITY
PROGRAMS FOR LEARNING	CHEMISTRY WITH A COMPUTER
PROGRAMS FOR LEARNING	FUNDAMENTAL SKILLS FOR GENERAL CHEMISTRY
RIGHT ON PROGRAMS	SCIENCE PACKAGE C1
RIGHT ON PROGRAMS	SCIENCE PACKAGE C2
RIGHT ON PROGRAMS	SCIENCE PACKAGE C3
SCHOOL & HOME COURSEWARE	D = RT
SCHOOL & HOME COURSEWARE	INFERRING CONNECTIONS

SCIENCE TITLES TO BE EVALUATED - continued

PUBLISHER	TITLE
SCHOOL & HOME COURSEWARE	SCIENTIFIC NOTATION
SCHOOLHOUSE SOFTWARE	BUG CAGE GS-3B
SCHOOLHOUSE SOFTWARE	HOT [illegible]
SCHOOLHOUSE SOFTWARE	LAUNCH PAD GS-2B
SCHOOLHOUSE SOFTWARE	LIGHTNING BOLTS GS-1B
SCHOOLHOUSE SOFTWARE	MAD SCIENTIST GS-3A
SCHOOLHOUSE SOFTWARE	SUPER TOE GS-2A
SIMULATIONS SOFTWARE	YOU'RE THE DOCTOR
SOLARTEX	SUNGRAPH
SOLARTEX	SUNHEAT 1
SOLARTEX	SUNMAX
SOLARTEX	SUNSIM 2
SOLARTEX	SUNSIM 3
SOLARTEX	SUNSIM 4
STONYBROOK	HUNTINGTON 3
SYNERGISTIC SOFTWARE	ANATOMICAL ADVENTURE
SYNERGISTIC SOFTWARE	MICROBE
SYNERGISTIC SOFTWARE	STAR GAZER'S GUIDE
TAMARACK SOFTWARE	CHEMISTRY PROGRAMS
TAYLOR	UNDERSTANDING CHEMICAL FORMULAS
TEACH YOURSELF BY COMPUTER	CELL DIVISION GENETICS
TEACH YOURSELF BY COMPUTER	DIGESTION CIRCULATION
TEACH YOURSELF BY COMPUTER	PLANTS ECOLOGY CS
TEACH YOURSELF BY COMPUTER	REPRODUCTION MUSCLE BONE
TEACH YOURSELF BY COMPUTER	RESPIRATION EXCRETION NERVOUS ENDOCRINE SYSTEMS
TEACH YOURSELF BY COMPUTER	WEATHER FRONTS

(Over)

SCIENCE TITLES TO BE EVALUATED - continued

PUBLISHER	TITLE
VERNIER SOFTWARE	GRAPHICAL ANALYSIS
VERNIER SOFTWARE	KINEMATICS
VERNIER SOFTWARE	PROJECTILES
VERNIER SOFTWARE	RAY TRACER
VERNIER SOFTWARE	VECTOR ADDITION
VERNIER SOFTWARE	WAVE ADDITION
VISUAL MATERIALS	SOLVING MYSTERIES OF LIGHT
WILEY	COMPUTER AIDED INSTRUCTION
WILEY	CONCENTRATED CHEMICAL CONCEPTS
WILEY	GENERAL CHEMISTRY
WILEY	MECHANICS

SCIENCE TITLES WE ARE UNABLE TO RECOMMEND

PUBLISHER	TITLE	CPYRT.	CODE
ALTERNA TECHNICAL	CELL	0.0	41
ALTERNA TECHNICAL	CELL DIVISION	0.0	41
AQUARIUS	OCEANS	1982.0	41
AQUARIUS	PLANETS	1982.0	41
AQUARIUS	STARS	1982.0	41
AQUARIUS	STREAMS & RIVERS	1982.0	41
AVANT GARDE CREATIONS	DIGESTIVE SYSTEM	1981.0	41
AVANT GARDE CREATIONS	GAS LAWS	0.0	40
AVANT GARDE CREATIONS	HEART	1981.0	41
AVANT GARDE CREATIONS	INTRO. TO WEATHER CHARTS	0.0	40
AVANT GARDE CREATIONS	MECHANICS & MOTION	0.0	40
BLS	BASIC CHEMISTRY	0.0	50
BLS	CARDIOVASCULAR SYSTEM	0.0	50
BLS	CELL	0.0	50
BLS	CHEMICAL BASIS OF BIOLOGY	0.0	50
BLS	DIGESTIVE SYSTEM	0.0	50
BLS	ELEM. BIOLOGY	0.0	40
BLS	ELEM. EARTH SCIENCE	0.0	50
BLS	ENDOCRINE SYSTEM	0.0	50
BLS	FIRST SEMESTER ELEMENTS OF PHYSICS	0.0	50
BLS	INTRO. TO MICROBIOLOGY	0.0	50

NUMERICAL CODES: 40-43: EVALUATED UNFAVOURABLY

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SCIENCE TITLES WE ARE UNABLE TO RECOMMEND

PUBLISHER	TITLE	CPYRT.	CODE
BLS	LYMPHATIC SYSTEM	0.0	50
BLS	MUSCULAR SYSTEM	0.0	50
BLS	NERVOUS SYSTEM	0.0	50
BLS	NUTRITION METABOLISM FLUID & ELECROLYTE BALANCE	0.0	50
BLS	PERCEPTION CONCEPTS IN SIGHT & HEARING	0.0	50
BLS	REPRODUCTION IN HUMANS	0.0	50
BLS	REPRODUCTIVE SYSTEM	0.0	50
BLS	RESPIRATORY SYSTEM	0.0	50
BLS	SECOND SEMESTER ELEMENTS OF PHYSICS	0.0	50
BLS	SKELETAL SYSTEM	0.0	50
BLS	SKIN	0.0	50
BLS	SPECIAL SENSES	0.0	50
BLS	URINARY SYSTEM	0.0	50
COMPRESS	ALCOHOLS	1980.0	70
COMPRESS	ALDEHYDES & KETONES	1980.0	70
COMPRESS	ALKANES & ALKENES	1980.0	70
COMPRESS	ARENES	1980.0	70
COMPRESS	BIOBITS 1 LIFE	1982.0	41
COMPRESS	BIOBITS 2 HABIB FLAG	1982.0	41
COMPRESS	BIOBITS 8 ANALYTICS	1982.0	41
COMPRESS	CARBOXYLIC ACIDS	1980.0	70
COMPRESS	CHEMRAIN	1980.0	41

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SCIENCE TITLES WE ARE UNABLE TO RECOMMEND - continued

PUBLISHER	TITLE	CPYRT.	CODE
COMPRESS	IR & NMR SPECTROSCOPY	1980.0	70
COMPRESS	SUBSTITUTION REACTIONS	1980.0	41
CONDUIT	CAT LAB	0.0	60
CONDUIT	COEXIST	1980.0	43
CONDUIT	COMPUTERS IN BIOLOGY CURRICULUM	0.0	60
CONDUIT	ECOLOGICAL MODELING	1980.0	43
CONDUIT	ENZKIN	1979.0	43
CONDUIT	EVOLUT	1980.0	42
CONDUIT	GROUP VELOCITY	1981.0	70
CONDUIT	INTRODUCTORY MECHANICS FOR APPLE	1981.0	70
CONDUIT	LINKOVER	1980.0	42
CONDUIT	NEWTON	0.0	40
CONDUIT	OSMOTIC PRESSURE	0.0	60
CONDUIT	SCATTER	0.0	40
CONDUIT	TRIBBLES	1980.0	42
CONTROL DATA	PHYSICS ELEMENTARY MECHANICS	1982.0	41
CROSS EDUCATIONAL SOFTWARE	AQUARIUM	1981.0	41
CROSS EDUCATIONAL SOFTWARE	MOTION	0.0	40
CROSS EDUCATIONAL SOFTWARE	SOLAR SYSTEM ASTRONOMY	0.0	40
EDUCATIONAL ACTIVITIES	CELLS	1982.0	41
EDUCATIONAL ACTIVITIES	HEART LAB	0.0	40
EDUCATIONAL ACTIVITIES	PARTS OF MICROSCOPE	0.0	40

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SCIENCE TITLES WE ARE UNABLE TO RECOMMEND - continued

PUBLISHER	TITLE	CPYRT.	CODE
EDUCATIONAL COMPUTING SYSTEMS	ORDERIDENT	1980.0	42
EDUCATIONAL COURSEWARE	POPULATION	1980.0	41
EDUCATIONAL MATERIALS & EQUIPMENT	ADVANCED GENETICS	0.0	60
EDUCATIONAL MATERIALS & EQUIPMENT	CALORIMETRY & THERMODYNAMICS	1983.0	41
EDUCATIONAL MATERIALS & EQUIPMENT	CHEMISTRY I SERIES	0.0	40
EDUCATIONAL MATERIALS & EQUIPMENT	DENSITY RUTHERFORD ATOM	0.0	40
EDUCATIONAL MATERIALS & EQUIPMENT	MEIOSIS	1982.0	41
EDUCATIONAL MATERIALS & EQUIPMENT	NATURAL SELECTION	1982.0	41
EDUCATIONAL MATERIALS & EQUIPMENT	NUCLEIC ACIDS	1982.0	42
EDUCATIONAL MATERIALS & EQUIPMENT	OSMOSIS & DIFFUSION	1982.0	43
EDUCATIONAL MATERIALS & EQUIPMENT	POPULATION FLUCTUATIONS	1982.0	43
EDUCATIONAL MATERIALS & EQUIPMENT	VECTORS & SCALARS	1983.0	41
EDUCATIONAL MATERIALS & EQUIPMENT	WATER POLLUTION	1982.0	42
ENCYCLOPAEDIA BRITANNICA	ENERGY & LIFE	1983.0	41
ENCYLOPAEDIA BRITANNICA	CELL	1983.0	41
FOCUS MEDIA	CHEMISTRY SERIES I	1983.0	41
FOCUS MEDIA	ENERGY	1983.0	41
FOCUS MEDIA	IDENTIFYING MINERALS	1982.0	41
FOCUS MEDIA	MATTER & ENERGY	1982.0	41
FOCUS MEDIA	WATER & WEATHER	1983.0	41
FOCUS MEDIA	YOUR BODY SER. 1	1982.0	41
FOCUS MEDIA	YOUR BODY SER. 2	1983.0	41

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SCIENCE TITLES WE ARE UNABLE TO RECOMMEND - continued

PUBLISHER	TITLE	CPYRT.	CODE
HARTMAN	KINETICS	1982.0	41
HIGH TECHNOLOGY SOFTWARE	CHEM LAB SIM. 1	0.0	60
HIGH TECHNOLOGY SOFTWARE	CHEM LAB SIM. 2	0.0	60
HIGH TECHNOLOGY SOFTWARE	CHEM LAB SIM. 3	0.0	60
HIGH TECHNOLOGY SOFTWARE	CHEM LAB SIM. 4	0.0	60
INFORMATICS SOFTWARE	FORCE & ENERGY	0.0	60
J&S SOFTWARE	ACCELERATION	0.0	40
J&S SOFTWARE	ACID BASE PROBLEMS	0.0	40
J&S SOFTWARE	ACID BASE THEORIES	0.0	40
J&S SOFTWARE	ACIDS & BASES	0.0	40
J&S SOFTWARE	ANIMAL REPRODUCTION	1981.0	41
J&S SOFTWARE	ASEXUAL REPRODUCTION	1981.0	41
J&S SOFTWARE	ATOMS	0.0	40
J&S SOFTWARE	BIOCHEMISTRY	1981.0	41
J&S SOFTWARE	BONDING	0.0	40
J&S SOFTWARE	BONDING BETWEEN MOLECULES	0.0	40
J&S SOFTWARE	BONDING IN MOLECULES	0.0	40
J&S SOFTWARE	CARBON CHEMISTRY	0.0	40
J&S SOFTWARE	CELLS	1981.0	41
J&S SOFTWARE	CHEMICAL EQUATIONS	0.0	40
J&S SOFTWARE	CIRCULAR MOTION	0.0	40
J&S SOFTWARE	CLASSIFICATION	1981.0	41

NUMERICAL CODES: 40-43: EVALUATED UNFAVOURABLY 50: PRODUCT HAS BEEN DISCONTINUED BY THE PRODUCER

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SCIENCE TITLES WE ARE UNABLE TO RECOMMEND - continued

PUBLISHER	TITLE	CPYRT.	CODE
J&S SOFTWARE	DIGESTION	1981.0	41
J&S SOFTWARE	ELECTRICITY	0.0	40
J&S SOFTWARE	ELECTROCHEMICAL CELLS	0.0	40
J&S SOFTWARE	ELECTRON STRUCTURE	0.0	40
J&S SOFTWARE	ENDOCRINE SYSTEM	1981.0	41
J&S SOFTWARE	ENERGY	0.0	40
J&S SOFTWARE	EQUILIBRIUM	0.0	40
J&S SOFTWARE	EXCRETION	1981.0	41
J&S SOFTWARE	FAMILIES OF ATOMS	0.0	40
J&S SOFTWARE	FREE FALL	0.0	40
J&S SOFTWARE	GAS RELATIONSHIPS	0.0	40
J&S SOFTWARE	GENETICS	1981.0	41
J&S SOFTWARE	KINETICS	0.0	40
J&S SOFTWARE	LIGHT	0.0	40
J&S SOFTWARE	LOCOMOTION	1981.0	41
J&S SOFTWARE	MAGNETISM	0.0	40
J&S SOFTWARE	MATTER	0.0	40
J&S SOFTWARE	MOLES & FORMULAS	0.0	40
J&S SOFTWARE	MOMENTUM	0.0	40
J&S SOFTWARE	MOTION	0.0	40
J&S SOFTWARE	NERVOUS SYSTEM	1981.0	41
J&S SOFTWARE	NEWTON'S LAWS	0.0	40

NUMERICAL CODE:: 10-43: EVALUATED UNFAVOURABLY

[illegible]: UNABLE TO OBTAIN A PREVIEW COPY

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PUBLISHER	TITLE	CPYRT.	CODE
J&S SOFTWARE	ORGANIC CHEMISTRY	0.0	40
J&S SOFTWARE	OXIDATION REDUCTION	0.0	40
J&S SOFTWARE	PERIODIC TABLE	0.0	40
J&S SOFTWARE	PHOTOSYNTHESIS & TRANSPORT	1981.0	41
J&S SOFTWARE	PROJECTILE PROBLEMS	0.0	40
J&S SOFTWARE	RADIOACTIVITY	0.0	40
J&S SOFTWARE	REACTIONS	0.0	40
J&S SOFTWARE	REPRODUCTION PLANTS	1981.0	41
J&S SOFTWARE	RESPIRATION	1981.0	41
J&S SOFTWARE	SOLUTIONS	0.0	40
J&S SOFTWARE	SOUND	0.0	40
J&S SOFTWARE	TRANSPORT	1981.0	41
J&S SOFTWARE	UNIFORM MOTION	0.0	40
J&S SOFTWARE	WORK & ENERGY	0.0	40
MCGRAW HILL RYERSON	GEOLOGY SEARCH	1982.0	41
MERLAN SCIENTIFIC	GAS LAWS & KINETIC MOLECULAR THEORY	1982.0	41
MICRO ED	OIL RIG	1982.0	41
MICRO POWER LIGHT	CIRCULATION ORGANS	1980.0	41
MICRO POWER LIGHT	CIRCULATION SYSTEM	1980.0	41
MICRO POWER LIGHT	EAR	1982.0	41
MICRO POWER LIGHT	REPRODUCTION ORGANS	1980.0	41
MICRO POWER LIGHT	REPRODUCTION PROCESS	1980.0	41

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SCIENCE TITLES WE ARE UNABLE TO RECOMMEND - continued

PUBLISHER	TITLE	CPYRT.	CODE
MICRO POWER LIGHT	SCIENTIFIC METHOD	0.0	40
MICRO POWER LIGHT	SIMPLE MACHINES	1980.0	41
MICROCOMPUTERS IN EDUCATION	LIGHTBULBS	1981.0	41
MICROPHYS PROGRAMS	CHEMISTRY 1	0.0	60
MICROPHYS PROGRAMS	CHEMISTRY 2	0.0	60
MICROPHYS PROGRAMS	PHYSICS 1	0.0	60
MICROPHYS PROGRAMS	PHYSICS 2	0.0	60
MUSE SOFTWARE	THREE MILE ISLAND	0.0	40
PROGRAMMA INTERNATIONAL	PLANETS	0.0	40
PROGRAMS FOR LEARNING	ATOMIC STRUCTURE	1982.0	41
PROGRAMS FOR LEARNING	CHEMICAL EQUILIBRIUM	1982.0	41
PROGRAMS FOR LEARNING	ORGANIC NOMENCLATURE	1981.0	41
PROGRAMS FOR LEARNING	SPECTRO PH METER WHEATSTONE BRIDGE	1982.0	41
SUBLOGIC COMMUNICATIONS	SATURN NAVIGATOR	1982.0	70
SYNERGISTIC SOFTWARE	PLANETARY GUIDE	0.0	40
VERNIER SOFTWARE	ORBIT	1982.0	41
WILEY	ORGANIC & BIOLOGICAL CHEMISTRY	1983.0	41

NUMERICAL CODES: 40-43: EVALUATED UNFAVOURABLY 50: PRODUCT HAS BEEN DISCONTINUED BY THE PRODUCER

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SPECIAL EDUCATION INDEX

RESULTS

PUBLISHER	TITLE	STATUS (REGULAR CLASSES)	PAGE
Edu-Ware Services	Counting Bee	Supplementary (K - 3)	SpEd 3
Milliken Publishing Co.	Math Sequences	Recommended (1 - 8)	SpEd 5
SRA	Mathematics: Levels A, B and C	Recommended (1 - 6)	SpEd 7

LIST OF TITLES TO BE EVALUATED SpEd 9

LIST OF TITLES WE ARE UNABLE TO RECOMMEND SpEd 11

COUNTING BEE

APPLICABILITY TO SPECIAL EDUCATION STUDENTS

Eduware's "Counting Bee" was evaluated by teachers of mentally handicapped students to determine if it could be used with this target audience. Their observations are summarized below. As this product has been described elsewhere in this report, only evaluative comments are shown here. Readers are reminded that this package was found to be satisfactory for regular classes and the report in the mathematics section (p. Ma 11) should be read in conjunction with this one.

CONTENT EVALUATION

The program content is congruent with several special education curriculum areas and covers an appropriate range of development skills. Modules 1-4 inclusive should be used only after extensive use of concrete materials. Some L.D. children may find Module 3 to be difficult as it requires acute visual discrimination as well as counting skills. However, the first four modules offer a good opportunity for generalization of basic counting skills.

The later modules may be too advanced for some students, depending upon individual developmental levels. For example, the skills involved in measurement of weights or length may be beyond the scope of a learner at a time when learning basic counting skills is appropriate to his/her curriculum.

The absence of a reading requirement is a definite advantage.

INSTRUCTIONAL FORMAT EVALUATION

The input of answers into the computer requires the use of only number keys and the space bar, making it a very easy program for most students to use. A second attempt should be allowed prior to the incorrect response cue. Special education students frequently are compulsive and excited or have fine motor and visual/motor difficulties which inhibit keyboard precision.

Feedback is stimulating and motivating and is both audible and visual. The confirmation of the correct answer and the correction for the wrong response are done in a very positive manner. A high degree of learning should occur if the student is developmentally ready for the task. However, the feedback is directed more to an elementary age student and this form of reinforcement could be degrading to an older student.

TECHNICAL DESIGN EVALUATION

High resolution graphics are good quality, colorful and sized appropriately. They provide good visual discrimination practice.

The use of sound in the program can be very effective but it is distracting in the classroom unless the computer is equipped with headphones. Control of the sound could have been accomplished by making sound an available option in the management system.

MANAGEMENT SYSTEM

The ability of the teacher to make a choice of what sequence the learner is able to follow is good. There are several developmental learning levels represented on the disk. However, a very large drawback with the management system is the requirement for the teacher to change the learner's name and the scoreboard each time a new student uses the program. This becomes very time consuming for the teacher.

It would be more efficient if the trials per unit were replaced with a mastery requirement at each unit. The choice of the number of questions per unit is good but it is less efficient than if the teacher were to set an acceptable performance criterion which the computer could then use to guide the student through the program.

Also, control of the number parameters would be of value to special education teachers.

SUMMARY STATEMENT

This disk could be useful in special education classrooms as a supplement to direct teaching and after the use of concrete materials. However, teachers should be aware that the program does have limitations and weaknesses and they should be prepared for some frustrations, particularly in the use of the management system.

STATUS

COUNTING BEE has been designated as a SUPPLEMENTARY learning resource for regular classes.

PURCHASE INFORMATION

In Alberta, this package may be purchased for $37.90 (Oct. 1983) from D&A Microcomputers, Box 1295, High River, TOL 1B0, 652-2481. Local dealers may also market the product.

Defective diskettes will be replaced without charge within a 30 day warranty period.

There is no warranty for disks which become inoperable through normal use.

As the content is managed, a disk may be used with only one computer at a time.

MATH SEQUENCES

APPLICABILITY TO SPECIAL EDUCATION STUDENTS

Milliken's "Math Sequences" were evaluated by teachers of special education students (primarily mentally handicapped students) to determine if they could be used with this target audience. Their observations are summarized below. As this product has been described elsewhere in this report, only evaluative comments are shown here. Readers are reminded that this package was recommended for regular classes and the report in the mathematics section (p. Ma 31) should be read in conjunction with this one.

CONTENT EVALUATION

For learning disabled students, the more advanced skills are not generally used.

The disks on number readiness, addition and subtraction contain items that are appropriate for E.M.H. curriculum levels 1-4. At level 3, decimals, fractions, multiplication and division may be added. At level 4, percents and equations may be applicable. The other sequences are not covered enough in the curriculum to warrant purchase. For the above mentioned disks, content range and content sequence are good except for the lack of semi-abstract items.

The number readiness disk is appropriate for the T.M.H. level. Because of the concreteness of most of the curriculum, the lack of semi-abstract work in this package makes it appropriate for only the top students in the T.M.H. classroom. For these students, the number readiness, addition and subtraction sequences are appropriate.

For emotionally disturbed students the segmentation of the content into sufficiently small units allows visible progress and motivation through success.

Generally, the content range and sequence are appropriate for the target audiences. The linear sequence is well designed in small, logical and progressive units. The depth of the programs, however, is inadequate for most students as no instruction in the skills is provided. It should be noted that the series was designed as a drill and practice program. However, for these target audiences, much teacher instruction and interaction would still appear to be necessary. Also, in addition to the lack of instruction, many of the directions are sketchy and students can quickly become confused and/or frustrated. The students would have to be very familiar with the series before they could easily operate it on an independent basis.

INSTRUCTIONAL FORMAT EVALUATION

The active involvement of the student during the initial presention of the question is a strength, however, the student is not involved in the remediation, which is especially necessary for these target audiences. The feedback for incorrect answers relies on the student being willing and able to study the correct solution and make the necessary adjustments. Close teacher interaction will be needed to make this effective.

Since pretests and post tests are not included, the onus is on the teacher to assess the appropriate problem level of the individual student. The management system allows the teacher to specify the number of questions, mastery levels and failure levels in order to tailor programs to meet individual needs.

As many students in these target groups require a visual stimulus to determine if an entry is an appropriate choice, they might become frustrated by not having the opportunity to correct a wrong input once it is put into the computer. Another input, such as "press return", should be required after the user has determined if that is the correct answer that (s)he wants to enter.

The coding of the quantitative feedback displayed at the bottom of the screen is confusing and should be removed.

TECHNICAL DESIGN EVALUATION

The graphical feedback may be age-inappropriate. Some evaluators found the graphical reinforcements to be excellent. Others found that initial pleasure turned into frustration as the reinforcements were repetitive and slow in their presentation and erasure.

Answers are not always entered from right to left. Although what was done was technically correct, the program for the most part sets up an expectation of right to left progression.

Eye movement is not always sequential (from left to right, top to bottom) or consistent between programs. Total scanning of the screen by the student is therefore required in order to detect new information that has been presented.

With the exception of the unit on measurement, numbers and symbols are appropriately sized. The large character set enables individuals with a perceptual-visual problem to interact with these programs.

The use of the flashing signal to press return (and the red "X" on old versions) may be enough to trigger seizure activity in an epileptic individual.

Vocabulary and reading levels are appropriate for specified population groups, however the general readability is poor. Special education students generally require assistance in focussing attention and in consistent tracking through multiple step problems and all attempts should be made to ensure ease of progression through problem solutions. All extraneous information which serves to distract the student should be eliminated. Feedback statements and remedial presentations should be positioned at consistent locations on the screen and entry direction of questions and responses should follow a consistent format.

The package could be used by physically handicapped students, however the degree of severity of the individual student's physical handicap would have to be evaluated in terms of the user's ability to enter responses on the regular keyboard.

As there is no audio component involved in the programs, the use by hearing impaired students would not be precluded.

SUMMARY STATEMENT

These programs are not a teaching tool to replace the essential concrete manipulative aids. Rather, they could be used when concepts are thoroughly understood and when users need only practice. Notwithstanding the critical comments noted earlier, in terms of content, instructional design and technical quality, the Milliken Math Sequences are definitely appropriate and should be strongly considered for use with special education students.

STATUS

The package Milliken MATH SEQUENCES has been designated as a RECOMMENDED learning resource <u>for regular classes.</u>

PURCHASE INFORMATION

The package is available from the School Book Branch for $377.19 (Oct. 1983) (S.B.B. price of $443.75 - 15%).

Disks may be purchased individually for $54.15. This is the S.B.B. list price - 15%.

Defective diskettes will be replaced without charge within a 30 day warranty period. Disks which become inoperable through normal use may be replaced, within 13 months, for $12.16 each. (This is the S.B.B. price - 15%.)

Due to frequent disk access, disks in this package may be used with only one computer at a time.

MATHEMATICS: LEVEL A (Managed)
MATHEMATICS: LEVEL B (Managed)
MATHEMATICS: LEVEL C (Managed)

APPLICABILITY TO SPECIAL EDUCATIC' STUDENTS

SRA's "Mathematics Levels A, B and C" were evaluated by teachers of special education students (primarily mentally handicapped students) to determine if they could be used with this target audience. Their observations are summarized below. As this product has been described elsewhere in this report, only evaluative comments are shown here. Readers are reminded that this package was recommended for regular classes and the report in the mathematics section (p. Ma 35) should be read in conjunction with this one.

CONTENT EVALUATION

The content range and sequence appear appropriate for special education target audiences with the possible exception of TMH students. With some students, use of the series may be limited to whole number, addition, subtraction and multiplication functions.

The depth of instruction is inadequate for almost all students. It should be noted that the series was designed as a drill and practice program. However, for these target audiences, much teacher instruction and interaction would still appear to be necessary. Also, in addition to the lack of instruction, many of the directions are sketchy and students can quickly become confused and/or frustrated. The students would have to be very familiar with the series before they could easily operate it on an independent basis.

In some algorithms, the program moves the cursor to its next location. For example, in multiplication questions, the cursor is automatically placed in the correct location for each multiplication step. For many students, one of the most important aspects of using the algorithm is knowing the next point of focus

For emotionally disturbed students, the segmentation of the content into sufficiently small units allows visible progress and motivation through success.

INSTRUCTIONAL FORMAT EVALUATION

The degree of student interaction is a good feature. It helps to maintain attention to the task and interest in what is going on in the program by providing the student with control over the flow of the lesson.

Some of the feedback is adequate for these students. The boxes at the bottom were a motivational factor. However, some difficulty occurred with the quantitative results and the recommendation at the end of the drill. Students could not judge "how much harder" or "how much easier" their next lesson should be. Teacher involvement would be very necessary at this time. Perhaps a more specific instruction such as "you must go back to lesson two", would be better. Also, older students may not view the "happy face" positively.

If a student continues to err, the step by step solution to the problem tends to be inadequate for most target groups. The reading level will likely be too high and much instructor time will be required to work through these sections with the student. Also, the program's inability to accept renaming in the help mode may require the student to use paper and pencil to work the problem through.

The availability of a pre-test is an advantage.

TECHNICAL DESIGN EVALUATION

Well designed page layouts and good letter size contribute to the technical quality. The general readability level is appropriate and requires minimal teacher assistance (except as noted earlier).

Within the low level lessons for addition and subtraction, the flashing boxes moving across the screen were often a distraction. Another consideration is the fact that the flashing boxes on the screen may be enough to trigger seizure activity in an epileptic individual.

The package could be used by physically handicapped students since only single keystrokes are required and a minimum of accidental keystrokes is possible. The fact that the "help" command is performed with two keys is not overly difficult since the keys are adjacent.

As there is no significant audio component involved in the programs, the use by hearing impaired students would not be precluded.

The large character set allows individuals with a perceptual-visual problem to interact with these programs.

SUMMARY STATEMENT

The overall package would be useful to the target audiences as a resource to supplement classroom instruction. Its main function would be one of providing additional practice rather than instruction. It could not be used for stand-alone instruction without major modifications.

The cost of the package, however, may outweigh its utility.

STATUS

MATHEMATICS LEVELS A, B and C have been designated as RECOMMENDED learning resources for regular classes.

PURCHASE INFORMATION

These packages may be purchased from the School Book Branch at the following prices (Oct. 1983).

Level A $364.44 (S.B.B. list price $428.75 - 15%)
Level B $479.74 (S.B.B. list price $564.40 - 15%)
Level C $524.37 (S.B.B. list price $616.90 - 15%)

Disks may be purchased individually at the following prices (S.B.B. price -15%): Level A = $104.98; Level B = $99.45 Level C = $93.93

Defective diskettes may be replaced at no charge within 90 days.

Disks which become inoperable through normal use may be replaced at a nominal charge of $7.74 (S.B.B. price - 15%). There is no time limit on this warranty.

As disk access is frequent, use of a disk is limited to one computer at a time.

SPECIAL EDUCATION TITLES TO BE EVALUATED

PUBLISHER	TITLE
EDUSOFT	COUNT & ADD
SOFTWARE RESEARCH	VISIBLE SPEECH AID

SPECIAL EDUCATION TITLES WE ARE UNABLE TO RECOMMEND

PUBLISHER	TITLE	CPYRT.	CODE
AQUARIUS	AGE OF RESPONSIBILITY	1981.0	41
AQUARIUS	ALL ABOUT INTEREST	1982.0	41
AQUARIUS	CONSUMER FRAUD	1982.0	41
AQUARIUS	CONSUMER HELP	1982.0	41
AQUARIUS	CONSUMERISM & YOU	1982.0	41
AQUARIUS	CREDIT	1982.0	41
AQUARIUS	DECISION MAKING	1981.0	41
AQUARIUS	EATING FOR GOOD HEALTH	1982.0	41
AQUARIUS	FRIENDS & YOU	1981.0	41
AQUARIUS	HOW TO FINANCE A CAR	1982.0	41
AQUARIUS	HOW TO GET & HOLD A JOB	1982.0	41
AQUARIUS	INTERVIEWING	1982.0	41
AQUARIUS	LAW	1981.0	41
AQUARIUS	LAWS FOR CONSUMERS	1982.0	41
AQUARIUS	MAP READING	1981.0	41
AQUARIUS	METRICS & YOU	1982.0	41
AQUARIUS	NEW ON THE JOB	1982.0	41
AQUARIUS	PART TIME JOBS	1982.0	41
AQUARIUS	READING AN ADVERTISEMENT	1982.0	41
AQUARIUS	SELF CONCEPT & YOUR WORK	1982.0	41
AQUARIUS	SHOPPING IN A COMPARATIVE WAY	1982.0	41

NUMERICAL CODES: 40-43: EVALUATED UNFAVOURABLY

50: PRODUCT HAS BEEN DISCONTINUED BY THE PRODUCER

60: UNABLE TO OBTAIN A PREVIEW COPY

70: CONTENT IS OUTSIDE THE ALBERTA CURRICULUM

(Over)

PUBLISHER	TITLE	CPYRT.	CODE
AQUARIUS	SUCCEEDING	1981.0	41
AQUARIUS	THE JOB & YOU	1982.0	41
AQUARIUS	TIPS ON BUYING A USED CAR	1982.0	41
AQUARIUS	UNDERSTANDING LABELS	1982.0	41
AQUARIUS	YOU & INSURANCE	1982.0	41
ASHTON	WORDWARE REMEDIAL PROGRAMS	1982.0	41
EDUCATIONAL ACTIVITIES	OUR WEIRD & WACKY WORLD	1981.0	41
HAPPY APPLE SOFTWARE	MAGIC BLACKBOARD	1981.0	41
INTERPRETIVE EDUCATION	HOME SAFE HOME	1982.0	41
INTERPRETIVE EDUCATION	INCOME MEETS EXPENS	1982.0	41
INTERPRETIVE EDUCATION	JOB READINESS	1982.0	41
INTERPRETIVE EDUCATION	POISON PROOF YOUR HOME	1982.0	41
INTERPRETIVE EDUCATION	YOU CAN BANK ON IT	1982.0	41
LEARNING WELL	FACT OR OPINION	1982.0	41
MECC	SPECIAL NEEDS VOL.2	1.0	41
MEP REGIONAL CENTRE	LETTERS	1983.0	41
MEP REGIONAL CENTRE	NUMBERS	1983.0	41
MEATH HILL PROFESSIONAL WORKSHOP	ACE APPLE 2 DEMONSTRATION DISK	1982.0	41
SUNBURST COMMUNICATIONS	TEASERS BY TOBBS	1982.0	42

NUMERICAL CODES: 40-43: EVALUATED UNFAVOURABLY

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60: UNABLE TO OBTAIN A PREVIEW COPY

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WORD PROCESSING

RESULTS

PUBLISHER	TITLE	GRADES	STATUS	PAGE
No titles have reached the final stage as of October 31, 1983				

LIST OF TITLES TO BE EVALUATED WP 3

LIST OF TITLES WE ARE UNABLE TO RECOMMEND WP 5

WORD PROCESSING PROGRAMS TO BE EVALUATED

PUBLISHER	TITLE
ACTION RESEARCH NORTHWEST	ZARDAX
APPLE COMPUTER	APPLEWRITER 2
APPLE COMPUTER	APPLEWRITER 2E
ARTSCI	MAGIC WINDOW 2
DATACOPE	DATACOPE SCRIBE
HAYDEN BOOK	PIE WRITER
INFORMATION UNLIMITED SOFTWARE	EASYWRITER PROFESSIONAL
INTELLIGENT COMPUTER SYSTEMS	Q TEXT
KENSINGTON MICROWARE	FORM LETTER MODULE
M D SOFTWARE	WORD PROCESSOR 2
MANN	DOCUWRITER
MANN	MASTER TEXT PROCESSOR
MICROPRO INTERNATIONAL	WORDSTAR
MONUMENT COMPUTER SERVICE	REPORT WRITER
MUSE SOFTWARE	SUPERTEXT 2
ON LINE SYSTEMS	SCREEN WRITER 2
PEACHTREE SOFTWARE	PEACH TEXT
PERFECT SOFTWARE	PERFECT WRITER
RAINBOW COMPUTING	WRITE ON
SCHOLASTIC	BANK STREET WRITER
SIERRA ON-LINE	SCREENWRITER II
SILICON VALLEY	WORD HANDLER 2E
SOUTHWESTERN DATA SYSTEMS	CORRESPONDENT

WORD PROCESSING PROGRAMS WE ARE UNABLE TO RECOMMEND

PUBLISHER	TITLE	CPYRT.	CODE
A B BUSCAGLIA	LETTER WRITER	0.0	40
AMERICAN SOFTWARE SYSTEMS	WORD TYPE	0.0	40
COMPUTER CONCEPTS	PAGE PROCESSOR	0.0	40
CREATIVE DISCOUNT SOFTWARE	PERSONAL TEXT PROCESSOR	0.0	40
DATA SOFT	TEXT WIZARD	0.0	40
EASTERN HOUSE SOFTWARE	PIG PEN	0.0	40
HOHENBRINK	TEXT EDITOR	0.0	40
KENSINGTON MICROWARE	FORMAT TWO	0.0	40
LAST	QUICKWRITER	0.0	40
LJK ENTERPRISES	LETTER PERFECT	0.0	40
MICROMATION	GUTENBERG	0.0	40
MONUMENT COMPUTER SERVICE	LETTER MASTER	0.0	40
MONUMENT COMPUTER SERVICES	LETTERITE	0.0	40
MPA	WORD PROCESSING	0.0	40
NIBBLE	LEXICOM	0.0	40
ON LINE SYSTEMS	SUPERSCRIBE 2	0.0	40
PEACHTREE SOFTWARE	MAGIC WAND	0.0	40
PERSONAL COMPUTER SERVICE	MIGHTY MITE	0.0	40
SELECT INFORMATION SOFTWARE	SELECT	0.0	40
SOFSYS/PERSONAL BUSINESS SYSTEMS	EXECUTIVE SECRETARY	0.0	40

NUMERICAL CODES: 40-43: EVALUATED UNFAVOURABLY

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